FURUNO

INSTALLATION MANUAL

COLOR SECTOR SCANNING SONAR

MODEL CH-37

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⚠ SAFETY INSTRUCTIONS

⚠ WARNING



ELECTRICAL SHOCK HAZARD
Do not open the equipment unless totally familiar with electrical circuits and service manual.

Only qualified personnel should work inside the equipment.

Turn off the power at the switchboard before beginning the installation.

Fire or electrical shock can result if the power is left on.

Do not install the equipment where it may get wet from rain or water splash.

Water in the equipment can result in fire, electrical shock or equipment damage.

Be sure no water leaks in at the transducer installation site.

Water leakage can sink the vessel. Also confirm that the transducer will not loosen by ship's vibration. The installer of the equipment is solely responsible for the proper installation of the equipment. FURUNO will assume no responsibility for any damage associated with improper installation.

⚠ WARNING

Install the specified transducer tank in accordance with the installation instructions. If a different tank is to be installed the shipyard is solely responsible for its installation, and it should be installed so the hull will not be damaged if the tank strikes an object.

The tank or hull may be damaged if the tank strikes an object.

If a steel tank is installed on a wooden or FRP vessel, take appropriate measures to prevent electrolytic corrosion.

Electrolytic corrosion can damage the hull.

Be sure that the power supply is compatible with the voltage rating of the equipment.

Connection of an incorrect power supply can cause fire or equipment damage. The voltage rating of the equipment appears on the label above the power connector.

⚠ CAUTION

Ground the equipment to prevent electrical shock and mutual interference.

Observe the following compass safe distances to prevent deviation of a magnetic compass:

	Standard compass	Steering compass
Display unit	2.2 m	1.6 m

WORKING WITH THE SONAR OIL

Precautions

- Keep oil away from eyes. Wear protective gloves when working with the oil. The oil can cause inflammation of the eyes.
- Do not touch the oil. Wear protective gloves when working with the oil. The oil can cause inflammation of the skin.
- Do not ingest the oil. Diarrhea or vomiting can result.
- Keep the oil out of reach of children.

Emergency

- If the oil enters eyes, flush with clean water about 15 min. Consult a physician.
- If the oil contacts skin, wash with soap and water.
- If the oil is ingested, see a physician immediately.

Disposal of oil and its container

Dispose of oil and its container in accordance with local regulations. For further details, contact place of purchase.

Storage

Seal container to keep out foreign material. Store in dark place.

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EQUIPMENT LISTS

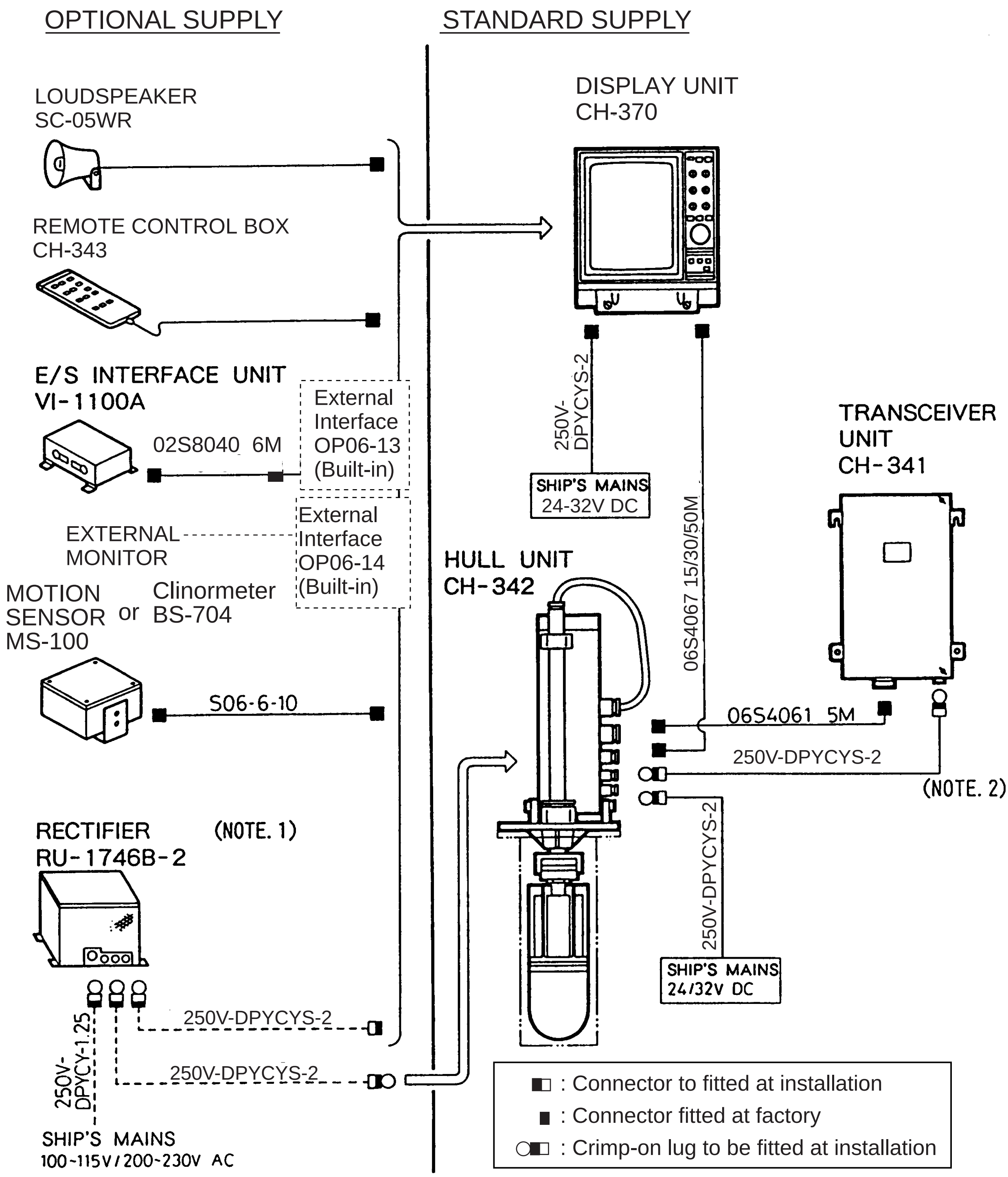
Standard Supply

Name	Type	Code No.	Qty	Remarks
Display Unit	CH-370	–	1	
Transceiver Unit	CH-341	–	1	60/81/113/162 kHz, select one
Hull Unit	CH-342	–	1	60/81/113/162 kHz, 24/32 VDC, Shaft length 1.17/2.2/3.8 m
Installation Materials	CP06-01100	000-068-457	Select one	Cable length: 15 m (standard supply)
	CP06-01110	000-068-458		Cable length: 30 m
	CP06-01120	000-068-459		Cab le length: 50 m
Spare Parts	SP06-01000	000-068-454	1 set	
Accessories	FP06-01600	000-068-460	1 set	Hood, vinyl cover

Optional Equipment

Name	Type	Code No.	Remarks
Motion Sensor	MS-100		
Clinometer	BS-704		
Remote Control Box	CH-343		
Steel Retraction Tank	06-007-1570	000-065-066	1.0 m
Steel Retraction Tank	SHJ-0001	000-066-643	1.8 m
Steel Retraction Tank	06-007-1571	000-065-070	3.5 m
FRP Retraction Tank	SHJ-0022	000-066-644	1 m
FRP Retraction Tank	06-007-1573	000-065-067	1.8 m
Aluminum Retraction Tank	OP10-5	000-069-763	1 m, with inst. materials
Rectifier	RU-1746B-2	000-030-439	110/220 VAC, 2 sets required
E/S Interface	VI-1100A	000-021-805	
Handle	OP03-70	008-423-420	
Loudspeaker	SC-05WR	000-136-156	4 ohm
Cable Assembly	MJ-A6SPF0012-050	000-134-424	64S4073-1, 5 m, 6 pin - 6 pin
Cable Assembly	MJ-A6SPF0012-100	000-133-817	64S4071-1, 10 m, 6 pin - 6 pin
Cable Assembly	MJ-A6SPF0011-050	000-132-244	03S9202-1, 5 m, 6 pin - 4 pin
Cable Assembly	MJ-A6SPF0011-100	000-132-336	03S9226-1, 10 m, 6 pin - 4 pin
5-pair Twisted Cable	CO-SPEVV-SB-C 0.2 x 5P	000-560-451	5 m
5-pair Twisted Cable	CO-SPEVV-SB-C 0.2 x 5P	000-560-452	10 m
5-pair Twisted Cable	CO-SPEVV-SB-C 0.2 x 5P	000-560-417	15 m
5-pair Twisted Cable	CO-SPEVV-SB-C 0.2 x 5P	000-103-868	20 m
48-core Cable	06S4056	000-126-160	For extension of cable between hull unit and transceiver unit, specify length
Filter	FP02-02620	002-007-290	
External E/S Interface	OP06-13	000-068-455	
External Monitor Interface	OP06-14	000-068-456	

SYSTEM CONFIGURATION

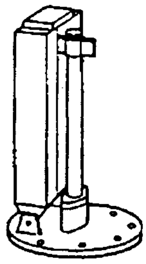


NOTE 1: Two sets of rectifiers are necessary for AC mains.

NOTE 2: DC ship's mains only. For AC ship's mains, the power is supplied directly from the rectifier unit to the transceiver unit.

Hull unit assembly combination

R/L DRIVE UNIT



Power	Freq.	Type	Code No.
DC24V	60kHz	CH-3421-60-2	006-547-010
	81kHz	CH-3421-81-2	006-547-030
	113kHz	CH-3421-115-2	006-547-050
	162kHz	CH-3421-162-2	006-547-070
DC32V	60kHz	CH-3421-60-3	006-547-020
	81kHz	CH-3421-81-3	006-547-040
	113kHz	CH-3421-115-3	006-547-060
	162kHz	CH-3421-162-3	006-547-080

SHAFT

Standard



1.17m

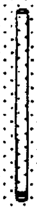
Type	Code No.
06-008-1021	100-028-500

Option



2.2m

Type	Code No.
SHJ-0006-1	661-000-061

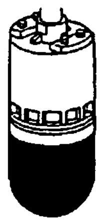


3.8m

Type	Code No.
06-007-1572	600-715-720

SOUNDOME

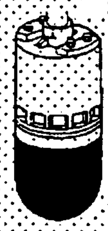
Standard



2.7 m cable

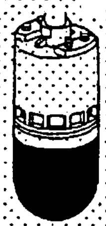
Power	Freq.	Type	Code No.
DC24V DC32V	60	CH-3422-60-11	006-547-090
	81	CH-3422-81-11	006-547-120
	113	CH-3422-115-11	006-547-150
	162	CH-3422-162-11	006-547-180

Option



3.7 m cable

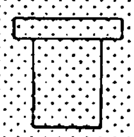
Power	Freq.	Type	Code No.
DC24V DC32V	60	CH-3422-60-22	006-547-100
	81	CH-3422-81-22	006-547-130
	113	CH-3422-115-22	006-547-160
	162	CH-3422-162-22	006-547-190



5.3m cable

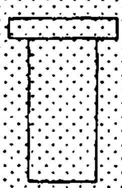
Power	Freq.	Type	Code No.
DC24V DC32V	60	CH-3422-60-38	006-547-110
	81	CH-3422-81-38	006-547-140
	113	CH-3422-115-38	006-547-170
	162	CH-3422-162-38	006-547-200

TANK



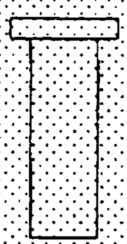
1m

Mat.	Type	Code No.
Steel	06-007-1570	600-715-700
FRP	SHJ-0022	661-000-220
Alum.	10-044-2601	100-127-500



1.8m

Mat.	Type	Code No.
Steel	SBI-0001-0	661-000-010
FRP	06-007-1573	600-715-730



3.5m

Mat.	Type	Code No.
Steel	06-007-1571	600-715-710

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MOUNTING

1.1 Hull Unit

General mounting considerations

- Noise and air bubbles will affect performance.
- Keep the transducer away from oil. Oil can corrode the cable.
- Do not expose the transducer to hot water. Hot water can damage the transducer.
- Do not turn on the equipment with the transducer exposed to air. Exposing the transducer to air may damage it.

Installation position considerations

Discussion and agreement are required with the dockyard and ship owner in deciding the location for the hull unit. When deciding the location, take into account the following points:

- Select an area where propeller noise, cruising noise, bubbles and interference from turbulence are minimal. Generally, the point at 1/3 to 1/2 of the ship's length from the bow or near the keel is the best. On-the-keel installation is advantageous for minimizing oil consumption in comparison with off-the-keel. If the hull unit cannot be installed on the keel, the center of the retraction tank should be within 1 meter of the keel to prevent a rolling effect.

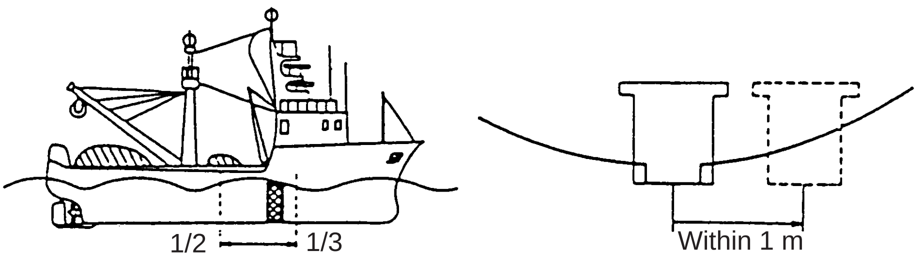


Figure 1-1 Installation location for hull unit

- Select a place where interference from the transducers of other sounding equipment is minimal. The hull unit should be at least 2.5 meters away from the transducers of other sounding equipment.
- An obstacle in the fore direction not only causes a shadow zone but also aerated water, resulting in poor sonar performance. Be sure to locate the transducer well away from any obstacle in the fore direction.

Mounting method

A typical mounting method is shown in the outline drawing at the back of this manual. Consult ship's owner, dockyard and user to determine appropriate mounting method. Pay attention to safety (strength, watertighness) first, followed by ease of maintenance and inspection.

Tank length

Shorten the transducer tank so the transducer is lowered into water as deep as possible.

Pay particular attention to the tank length Lt. Determine the length of the main shaft as described in the paragraph "Assembling and mounting of hull unit."

Note 1: Do not shorten the 1 meter retraction tank. Shortening it may also necessitate shortening of the top part of the main shaft, thereby destroying the watertight construction of the 1.17 meter shaft.

Note 2: When the retraction tank is constructed locally, finish it so that welding beads do not protrude on the inner surface of the tank. The tank guide will hit the bead, burning out the raise/lower motor. Also, do not position the welding bead in the ship's fore-aft line.

Note 3: Use of other manufacturer's tank is permitted. However, the dimensions should be the same as those in the transducer tank outline drawing.

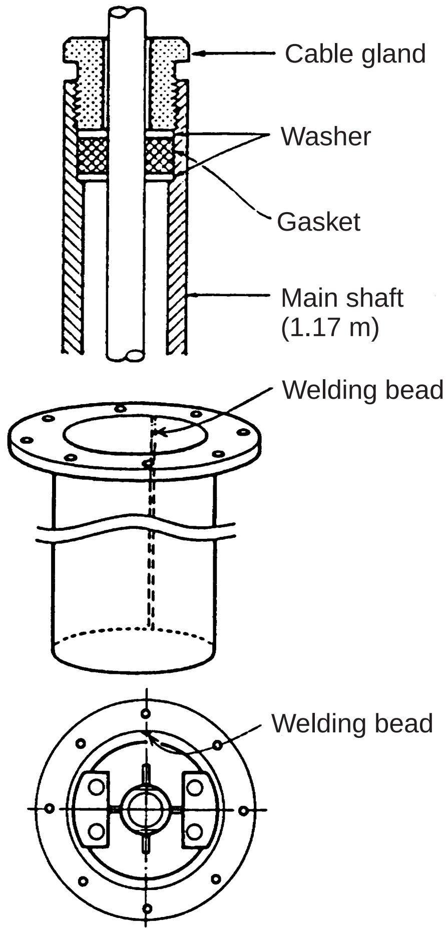


Figure 1-1 Transducer tank length and welding bead

Mounting of transducer tank

Install the transducer tank referring to the hull unit outline drawings at the back of this manual.

Note: Locate one of the bolt holes 10° to port to minimize mechanical shock at the raise/lower block during pitching and rolling.

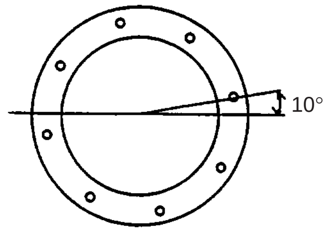


Figure 1-2 Transducer tank

Assembling and mounting of hull unit

The hull unit is shipped disassembled as the parts shown in the hull unit kit on pages 1-10 and 1-11. Assemble the hull unit as shown in the procedure below.

Necessary tools

Name	Specification	Remarks
Wrench	For M10 (Hex. size 17 mm)	
Wrench	For M20 (Hex. size 20 mm)	
Pipe Wrench	55 mm	
Ball Wrench	Hex size 4 mm	Supplied with hull unit kit

1. Unscrew 10 pieces of socket head cap screws with the ball wrench (supplied) to detach the soundome.

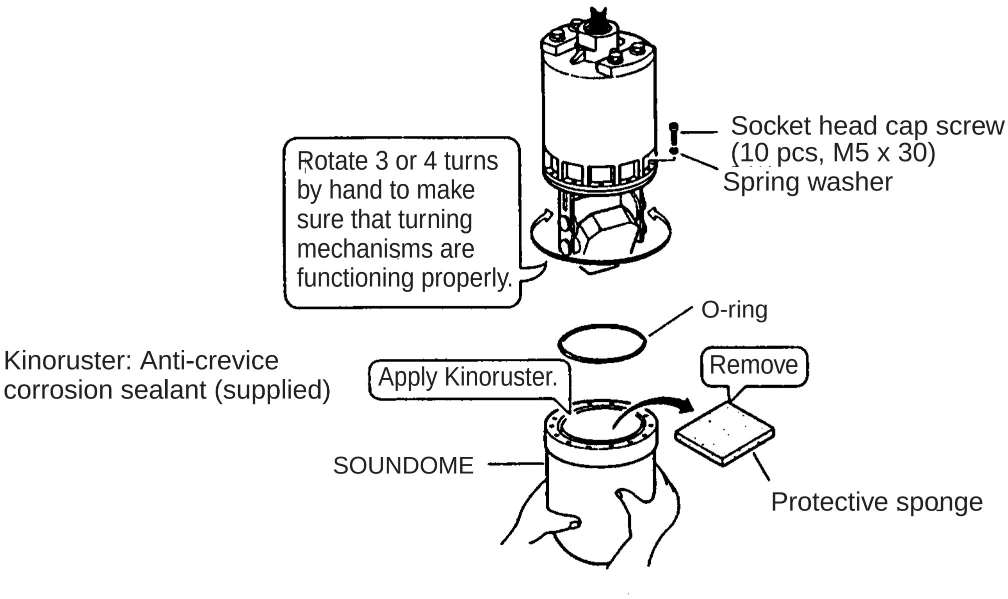
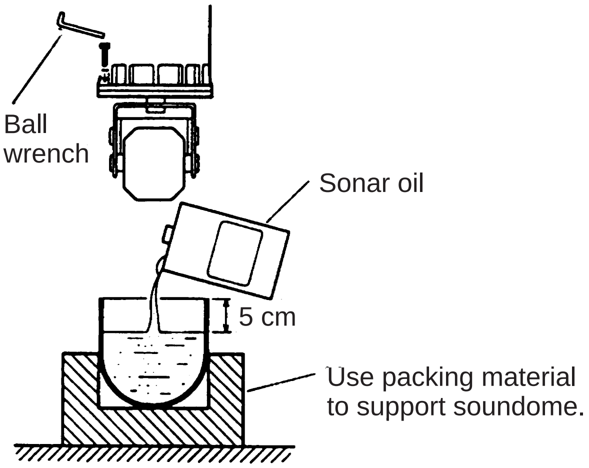


Figure 1-3 Detaching the soundome

2. Fill the soundome with sonar oil 6 cm below the top of the dome. (Use only the specified sonar oil. Use of other sonar oils may affect performance.) Reattach the soundome.

	Frequency (kHz)			
	60	81	113	162
Sonar oil 4L (000-824-033)	No	Yes	Yes	Yes
Super sonar oil 4L (000-804-568)	Yes	No	No	No



⚠ CAUTION

WORKING WITH THE SONAR OIL

Precautions

- Keep oil away from eyes. Wear protective gloves when working with the oil. The oil can cause inflammation of the eyes.
- Do not touch the oil. Wear protective gloves when working with the oil. The oil can cause inflammation of the skin.
- Do not ingest the oil. Diarrhea or vomiting can result.
- Keep the oil out of reach of children.

Emergency

- If the oil enters eyes, flush with clean water about 15 minutes. Consult a physician.
- If the oil contacts skin, wash with soap and water.
- If the oil is ingested, see a physician immediately.

Disposal of oil and its container

Dispose of oil and its container in accordance with local regulations. For further details, contact place of purchase.

Storage

Seal container to keep out foreign material. Store in dark place.

Figure 1-4 Filling the soundome with sonar oil

3. Shorten the main shaft by the length of Lt + 110 mm, where Lt is the length of the retraction tank. When the retraction tank length is 1 meter do not shorten the 1.17 meter main shaft.

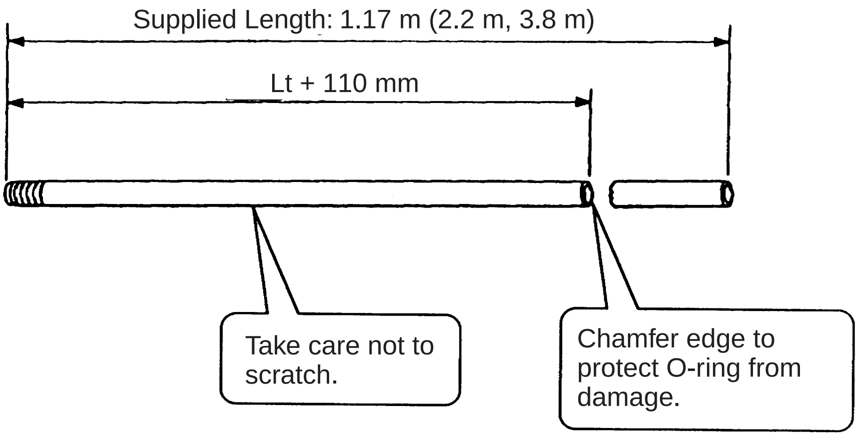


Figure 1-5 How to shorten the main shaft

4. Fasten the main shaft to the soundome assembly as follows:
   a) Attach screw lock nut to main shaft.
   b) Fully screw main shaft into the soundome neck, and then unscrew by four turns. Coat threads with adhesive (HIGH SUPER).
   c) Screw in main shaft completely and tighten the lock nut with spanner.
   d) Tighten socket-set screw on lock nut.
   e) Fasten two reinforce metal fittings to connect the main shaft and the soundome assembly securely (Not using the stopper washer).

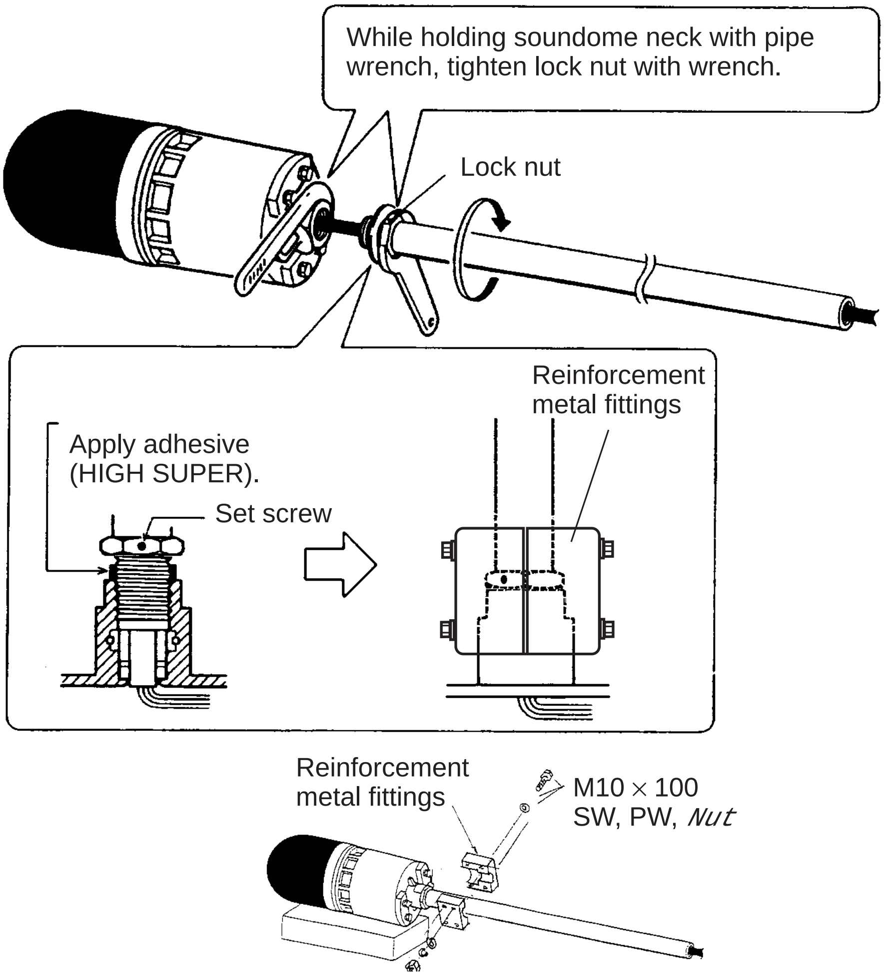


Figure 1-6 How to fasten main shaft to soundome assembly

5. Clean the main shaft and pass it through the main body flange.

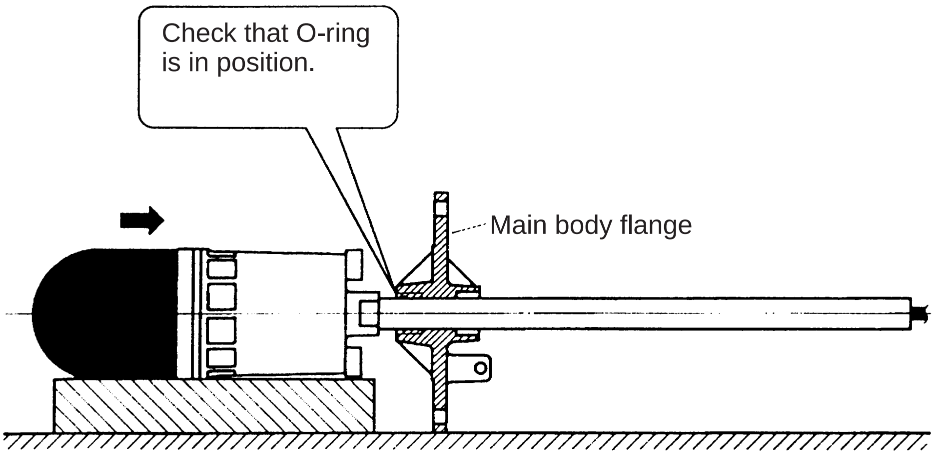


Figure 1-7 Passing main shaft through the main body flange

6. Set the grease cotton to the main body flange and tighten the grease cotton retainer temporarily.

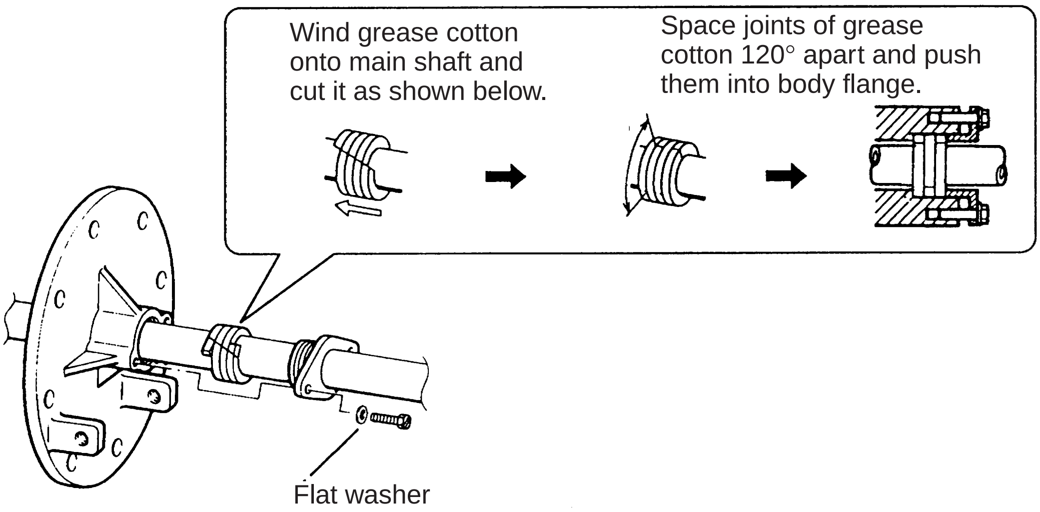


Figure 1-8 Installing grease cotton on the main shaft

7. Temporarily fasten the fastening band onto the main shaft at the location shown below.

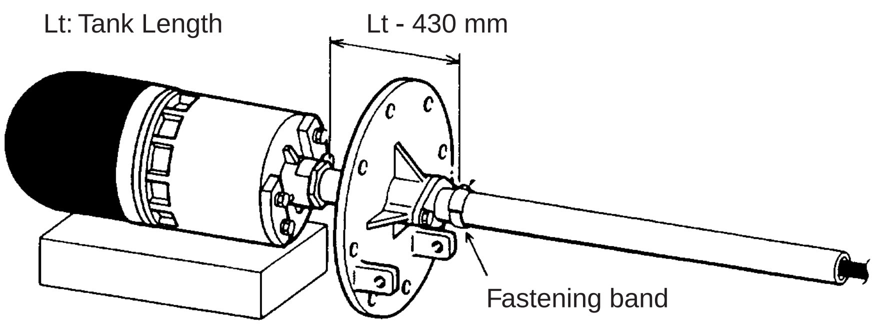


Figure 1-9 Fastening the fastening band on the main shaft

8. Inscribe bow mark at the top of the main shaft. Pass pipe clamp through the main shaft and install washer, gasket, and cable gland.

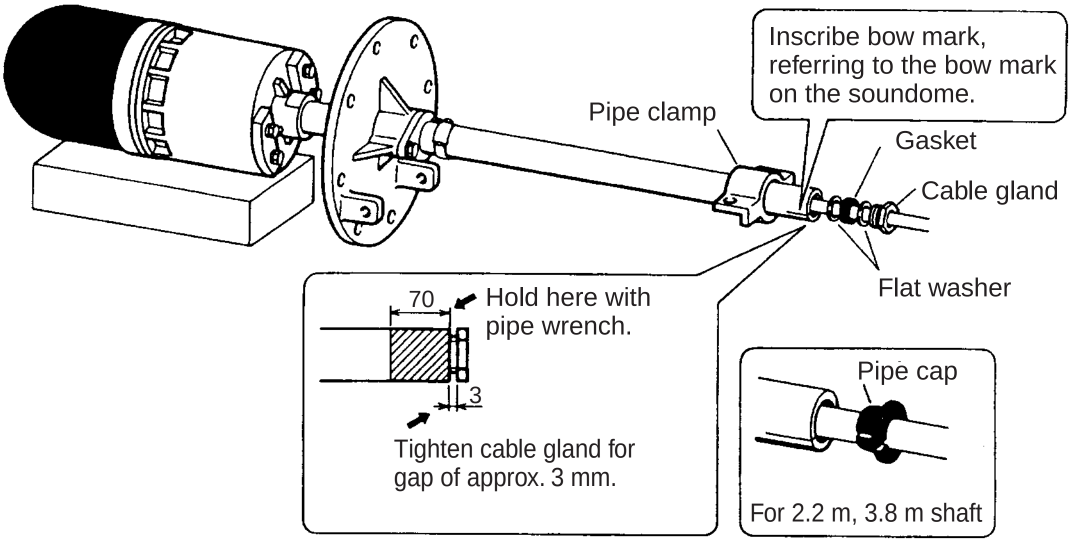


Figure 1-10 Passing pipe clamp, gasket, flat washer and cable gland on main shaft

9. Fasten the hull unit to the transducer tank, orienting it so the ship's fore-aft line crosses the front panel of the raise/lower drive block at an angle of approximately 45 degrees.

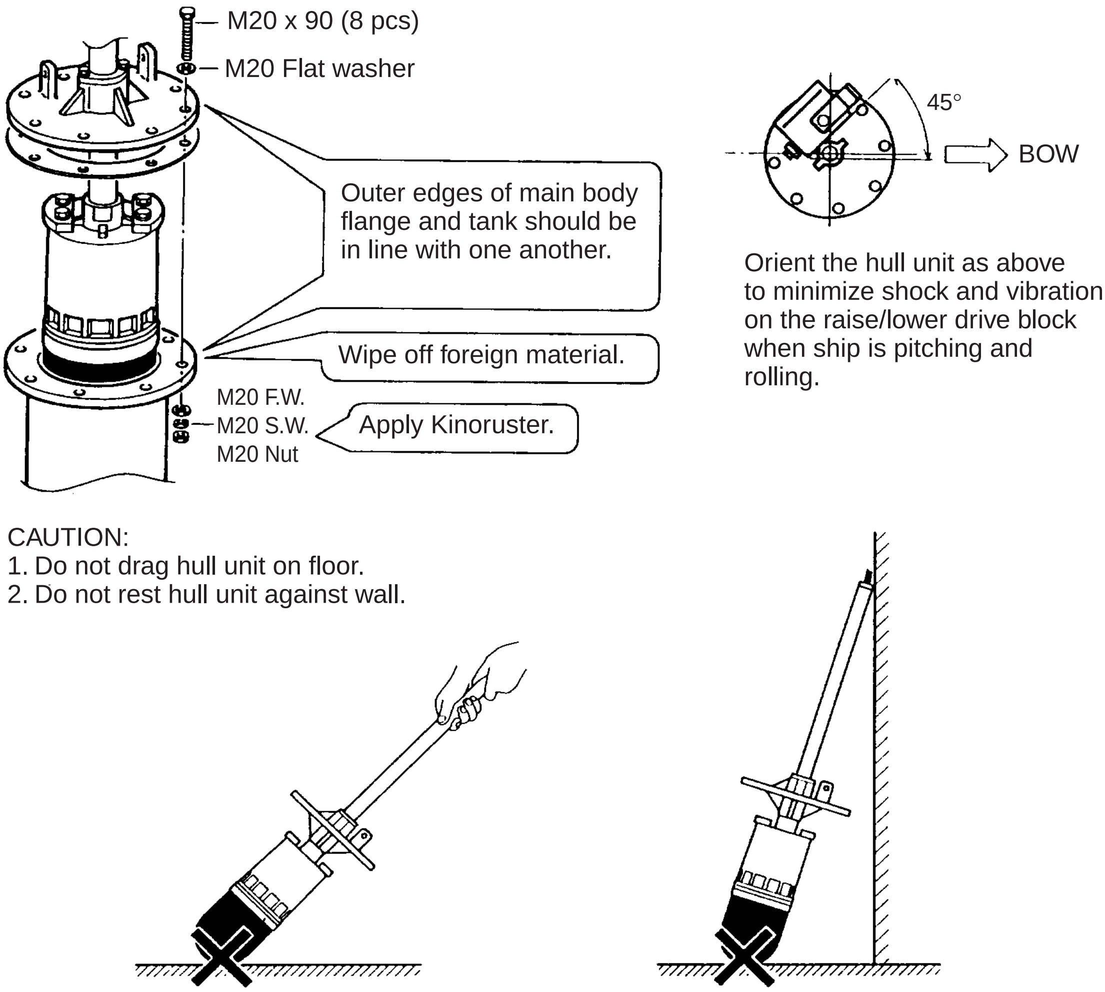


Figure 1-11 Fastening the hull unit to the transducer tank

10. Install the raise/lower drive block as follows:

   a) Rotate the main shaft so the bow mark faces ship's bow.
   b) Install the raise/lower drive block onto the main body flange.
   c) Fix the main shaft with the shaft retainer.
   d) Loosen the fastening band, slide it up to the shaft retainer and fasten it.
   e) Check that the distance from the top of the main shaft to the top of the shaft retainer is as follows:

      1.17 m main shaft: 75 mm
      Main shaft cut at Lt + 110 mm: 15 mm

   If not as shown above, loosen shaft retainer and fastening band to adjust the distance. This will place the bottom of the soundome 10 mm above the bottom of the retraction tank when the soundome is retracted.

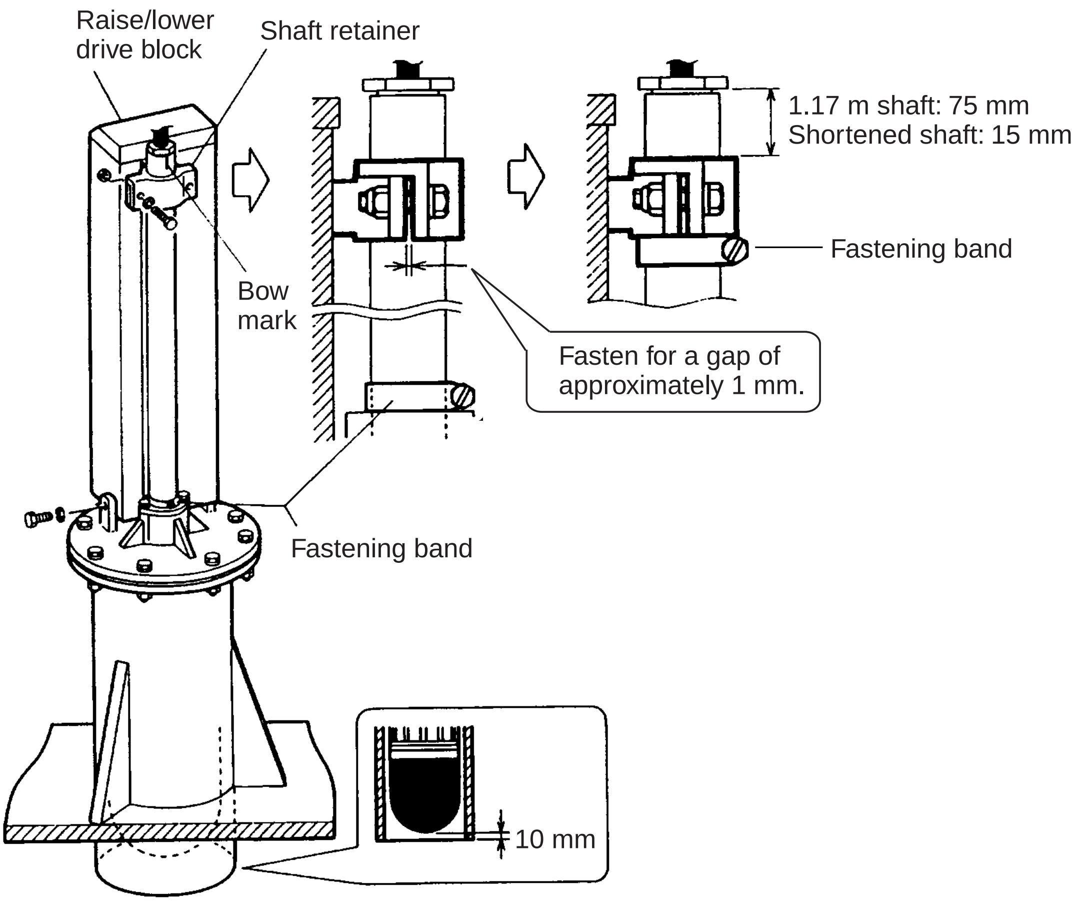


Figure 1-12 Installing the raise/lower drive block

11. Tighten the grease cotton retainer for a gap of 7 to 9 mm.

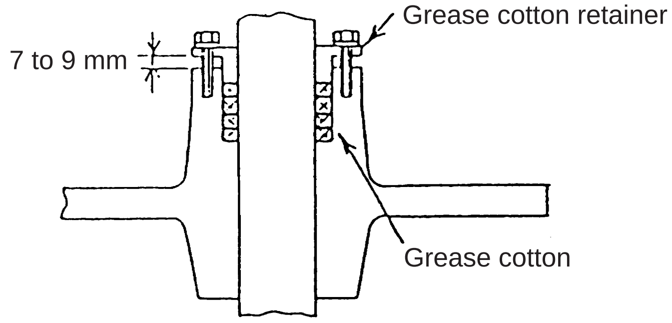


Figure 1-13 Tightening the grease cotton retainer

Checking manual raise/lower of transducer with hand crank

Perform this check after all wiring has been completed. Ship’s mains power must applied to the hull unit, otherwise the magnetic brake of the raise/lower motor activates, disabling the manual raise/lower gears.

1. Turn off the breaker on the hull unit.
2. Detach the brake-off switch cover.
3. Set hand crank to the screw shaft gear and turn it while pressing the brake-off switch.
4. The transducer should rise/lower smoothly with even force in upper to lower limits. If not, the centers of the main body flange and the retraction tank are not aligned. Adjust the hull mounting position if necessary.

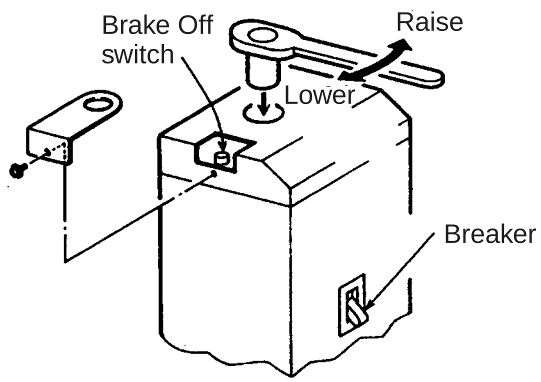
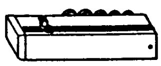
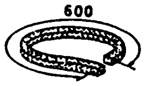
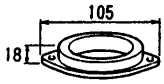
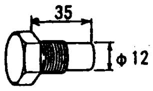
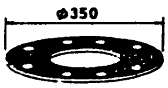
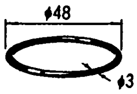
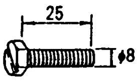
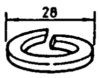
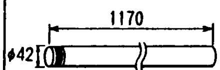
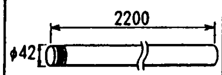
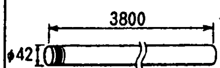
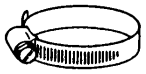
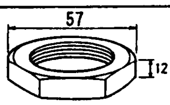
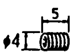
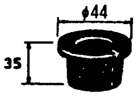
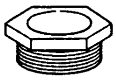
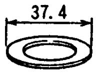
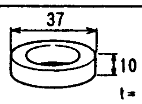
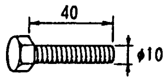
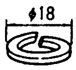
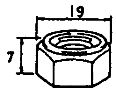
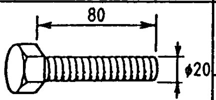
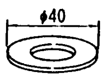
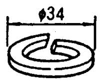
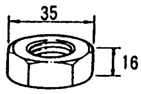
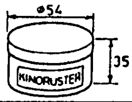
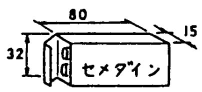
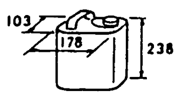
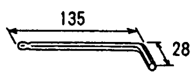


Figure 1-14 How to use the hand crank

Hull unit installation materials

番号 No.	名 称 NAME	略 図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	上下動部 RAISE/LOWER DRIVE ASSEMBLY		CODE NO.		
2	旋回部 SOUNDOME ASSEMBLY		CODE NO.		
3	フランジ MAIN BODY FLANGE		06－018－3202 CODE NO. 100－162－031	1	
4	グリスコットン GREASE COTTON		□9.5 ＊ 0.6M ＊ CODE NO. 000－859－013	(1)	
5	グリスコットン押え台 GREASE COTTON RETAINER		SHJ－0003－1 CODE NO. 661－000－031	(1)	
6	トラニオンボルト TRUNNION BOLT		06－013－3203－2 CODE NO. 100－143－912	(2)	
7	フランジパッキン GASKET		SHJ－0009－1 CODE NO. 661－000－091	(1)	
8	Oリング O RING		JISB2401－1A－P42 CODE NO. 000－851－142	(1)	
9	スリ割付六角ボルト SLOTTED HEX. BOLT		M8 × 25 SUS304 CODE NO. 000－801－701	(2)	
10	バネ座金 SPRING WASHER		M16 CODE NO. 000－864－265	(2)	
12	上下シャフト MAIN SHAFT		06－008－1021－0 CODE NO. 100－028－500	1	
			SHJ－0006－1 CODE NO. 661－000－061		
			06－007－1572 CODE NO. 600－715－720		
13	ジュビリークリップ FASTENING BAND		1X SUS304 CODE NO. 000－801－857	1	
14	止めナット LOCK NUT		06－013－2401－0 CODE NO. 100－098－730	1	
15	六角穴付止めネジ SOCKET SET SCREW		M4 × 5 SUS CODE NO. 000－801－527	1	

番号 No.	名　称 NAME	略　図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
16			CODE NO.		
17	パイプキャップ PIPE CAP		06 – 007 – 1307 – 0 CODE NO. 600 – 713 – 070	1	
18	締め付けグランド CABLE GLAND		06 – 008 – 1031 – 0 CODE NO. 100 – 028 – 520	1	
19	座金 WASHER		06 – 018 – 3302 – 0 CODE NO. 100 – 162 – 051	2	
20	ガスケット GASKET		06 – 018 – 3303 – 1 CODE NO. 100 – 162 – 061	1	
21	六角ボルト HEX. BOLT		M10 × 40 CODE NO. 000 – 862 – 184	2	
22	バネ座金 SPRING WASHER		M10 SUS304 CODE NO. 000 – 864 – 261	2	
23	Uナット U – NUT		M10 SUS304 CODE NO. 000 – 863 – 930	2	
24	六角ボルト HEX. BOLT		M20 × 80 CODE NO. 000 – 801 – 893	8	
25	ミガキ平座金 FLAT WASHER		M20 SUS304 CODE NO. 000 – 864 – 136	16	
26	バネ座金 SPRING WASHER		M20 SUS304 CODE NO. 000 – 864 – 270	8	
27	六角ナット NEX. NUT		M20 SUS304 CODE NO. 000 – 863 – 116	16	
28	金属すきま腐触防止剤 ANTI – CREVICE CORROSION SEALANT		KINORUSTER 855 CODE NO. 000 – 801 – 025	1	
29	セメダイン ADHESIVE		ハイスーパー HIGH SUPER CODE NO. 000 – 856 – 520	1	
30	ソナーオイル SONAR OIL		4 ℓ CODE NO. 000-824-033	1	60 kHz SUPER SONAR OIL 4L (000-804-568)
31	ボールレンチ BALL WRENCH		HEX. SIZE 4mm CODE NO. 000 – 804 – 123	1	
			CODE NO.		

番号 No.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS		数量 Q'TY	用途/備考 REMARKS
32	シャフト保護金具 REINFORCEMENT METAL FITTING		06-018-3305-0		2	
			CODE NO.	100-270-580		
33	六角ボルト HEX. BOLT		M10X100 SUS		4	
			CODE NO.	000-141-563		
34	ミガキ平座金 FLAT WASHER		M10 SUS304		8	
			CODE NO.	000-864-131		
35	バネ座金 SPRING WASHER		M10 SUS304		4	
			CODE NO.	000-864-261		
36	六角ナット HEX. NUT		M10 SUS304		4	
			CODE NO.	000-863-111		

1.2 Transceiver Unit

Mounting considerations

- The mounting location should be well ventilated and dry.
- The unit can be mounted on a bulkhead or the deck. The unit weighs 8.5 kg so reinforce the mounting location if necessary.
- Secure the maintenance space shown in drawing below for ease of maintenance and service.

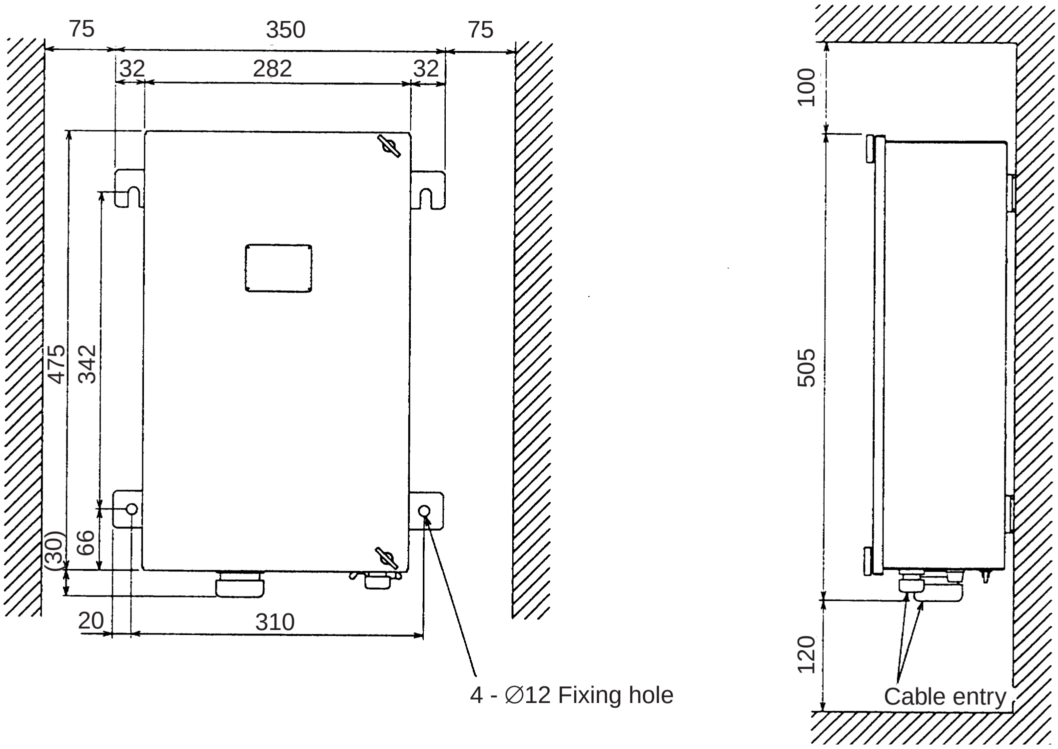


Figure 1-15 Mounting dimensions for the transceiver unit

1.3 Display Unit

Mounting considerations

Select the mounting location considering the following conditions:

- Select a location where the display unit can easily be operated while observing the fishing ground or area surrounding the vessel.
- Locate the unit at least 1 meter away from equipment which contains magnets (radar magnetron, loudspeaker).
- A magnetic compass will be affected if placed too close to the display unit. Observe the following compass safe distances to prevent deviation to a magnetic compass: Standard compass, 2.2 m, Steering compass, 1.6 m.
- Select a location not exposed to direct sunlight, water splash or hot air.
- Select a location which accommodates the viewing angle shown at right.

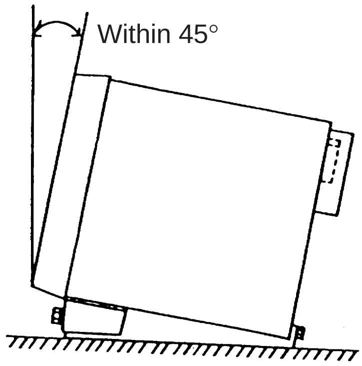
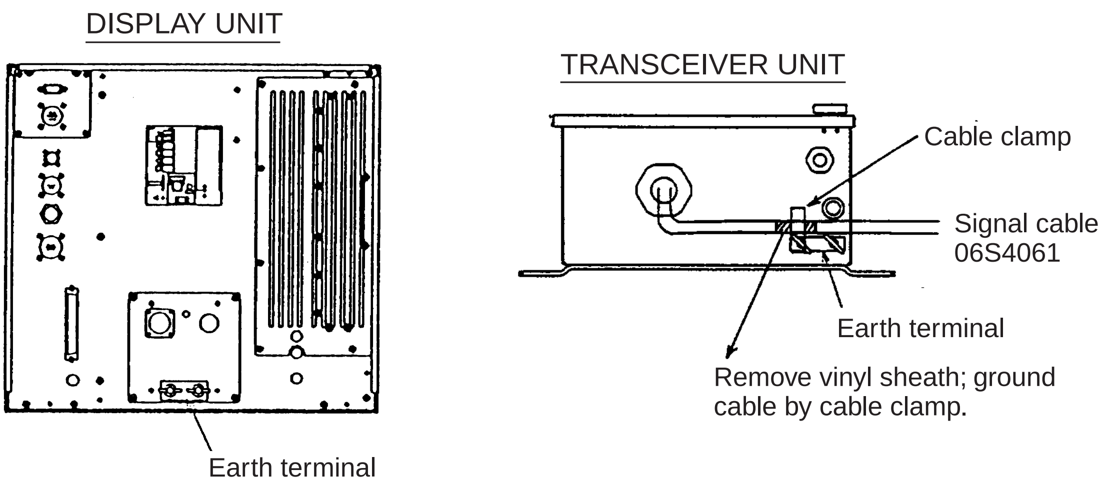


Figure 1-16 Display unit

1.4 Grounding the Display Unit and Transceiver Unit

Ground the equipment with a copper strap or ground wire to prevent interference.



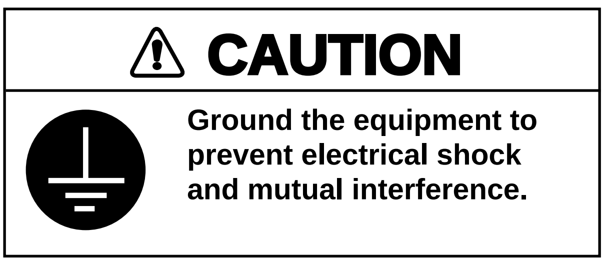


Figure 1-17 Location of earth terminals on display unit and transceiver unit

1.5 Motion Sensor MS-100 (Option)

The MS-100 measures ship's pitching and rolling angles with sensors using the principles of the gyroscope. The MS-100 is free from error caused by ship's vertical and horizontal motion. Therefore, it can be installed at any convenient location. However, ship's semi-permanent inclination due to loading imbalance cannot be detected. Compensate for this as described in Chapter 3.

Mounting considerations

- Vibration in the mounting area should be minimal.
- Locate the unit away from areas subject to water splash.
- The ambient temperature should not exceed 50°C.

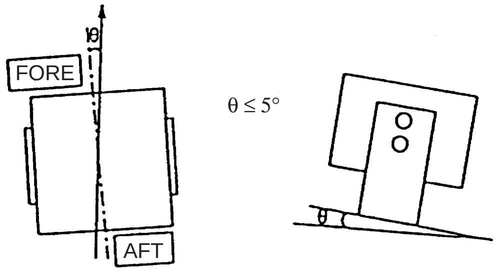


Figure 1-18 Motion sensor MS-100

Mounting procedure

Orient the FORE mark on the unit toward the ship's bow and mount the unit level to within 5° in all directions.

1.6 External Interface (Option)

This section shows how to install External E/S Interface (type OP06-13) and/or the External Monitor Interface (type OP06-14).

For connecting external monitor, prepare mini D-SUB 15 pin cable (male-male).

Recommended cable : EVNPSO5-50ft, manufactured by Black Box Japan Co.,Ltd.

<u>External monitor interface installation kit</u>

Part	Type, Q'ty	Code No.	Q'ty
External Monitor Interface Assy.	-	-	1
XH Connector Assy.	06-313 (13-13P)	006-550-840	1
Screw	M3x6	000-881-103	4
Screw	M3x8	000-881-404	1
Cable Ties	No.249	000-515-871	1

External E/S interface installation kit

Part	Type, Q'ty	Code No.	Q'ty
External E/S Interface Assy.	-	-	1
XH Connector Assy.	06-312 (6-6P)	006-550-830	1
Screw	M3x6	000-881-103	4
Screw	M3x8	000-881-404	1
Cable Ties	No.249	000-515-871	1

1. Remove the display unit cover.
2. Remove the dummy plate at the rear of the display unit.

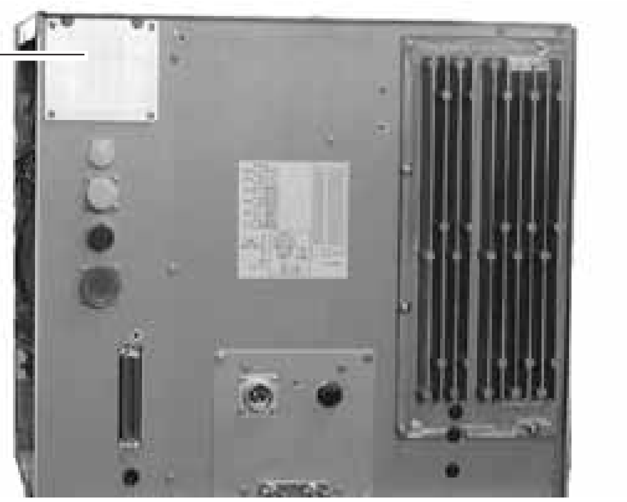


Figure 1-19 Display unit, rear view

3. Connect XH connector assy. to the Interface Module.
4. Fasten the Interface Module to the display unit with M3 x 6 screws and one M3 x 8 screw.

   For connecting External Monitor Interface (OP06-14) and External E/S interface (OP06-13), remove ESIF Board from OP06-13, and fix ESIF Board on OP06-14.

   For connecting logarithm amplifier video sounder, refer to next page.

5. Connect between J2 on the ESIF Board (06P0237) and J3 on the MAIN Board; connect between J1 on the RGB-BUFF Board (03P9229) and J4 on the MAIN Board.

6. Bind cables with the cable tie (supplied).

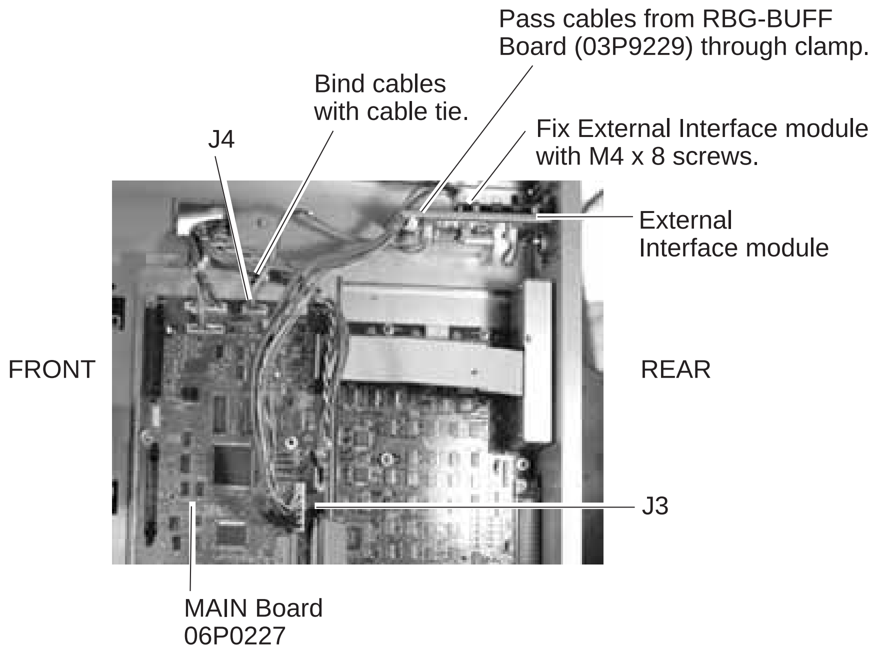


Figure 1-20 Display unit, cover removed, right side view

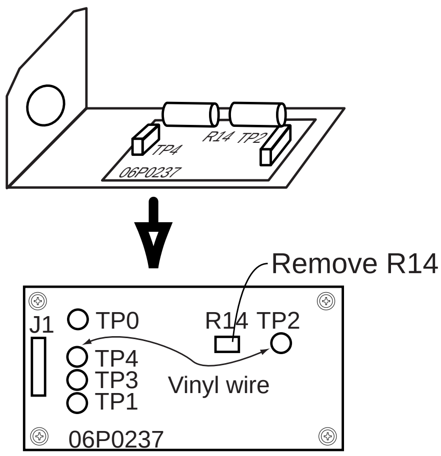
7. Close the cover.

1.7 Logarithm Amplifier Video Sounder

For connecting external video souder (logarithm amplifier:FCV-291,292,1000), modify ESIF board of OP06-13 (as below) and the INTERFACE UNIT VI-1100A. For INTERFACE UNIT VI-1100A modification, refer to installation manual of INTERFACE UNIT VI-1100A.

Modification of E/S interface

1. Remove chip resistor R14 from ESIF board (06P0237).
2. Solder vinyl wire between TP2 and TP4.



Note 1: Set “RES.COLOR” field in the E/S menu to “LOG”.

Note 2: Adjust “GAIN ” and “N.L.” of E/S memu.

1.8 Clinometer BS-704 (Option)

The clinometer detects ship's inclination caused by ship's rolling and pitching and its output is used to stabilize the sonar beam against rolling and pitching.

The clinometer is, in principle, a pendulum. It measures the inclination of the ship by sensing the direction of gravity acted on it and therefore when installed on a ship, it should be placed on or near the rotation axes of the ship's rolling and pitching. If it is placed away, upward from the axes, the measured value becomes larger than the correct value. On the contrary, if it is placed below the axes, the measured value becomes smaller. The same can be said when it is placed far to the left or right from the axes.

The rotation axes of pitching and rolling are theoretically considered to be located on the level of the ship's draft and in the center of ship. In other words, it can be said as follows.

1) Vertical position of the pitching and rolling axes is on the draft level of the ship.
2) Horizontal position of the rolling axis is in the center of ship's port-starboard line.
3) Horizontal position of the pitching axis is in the center of ship's fore-aft line.

From 1), 2) and 3) above, the crossing point of the two axes is indicated by the black dots in Figure 1-21. The clinometer should be mounted as close as possible to this point.

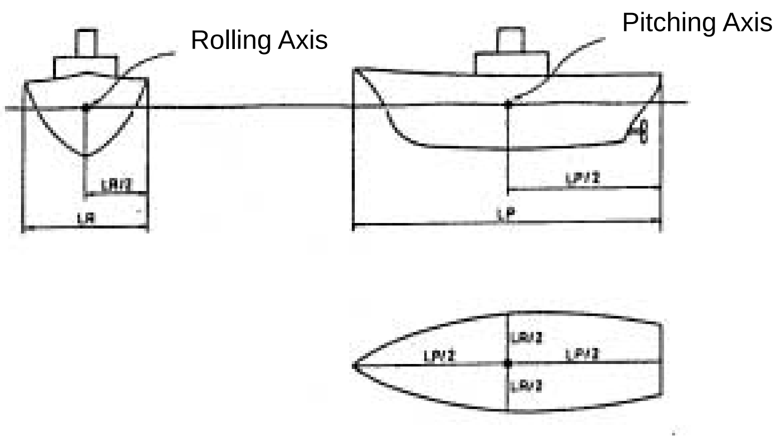


Figure 1-21 Installation Position of Clinometer

Cautions:

(1) The vicinity of the hull unit (on the ship's bottom) is too low and should be avoided, since the polarity of the measured value is reversed.

(2) When it is impossible to install the clinometer on the intersecting point of both rolling and pitching rotational axes, a special effort should be made to install it at place where the vertical distance to the intersecting point is minimum.

(3) The clinometer should be installed on the horizontal plane.

(4) Install the clinometer with the bow mark pointing in toward the ship's bow.

WIRING

2.1 Wiring Among Units

- The figure on the next page shows wiring among units.
- The signal cables are fitted with connectors. Connect the cables to the display, transceiver and hull units referring to the interconnection diagram and the drawing on page S-1.
- The power cable should be arranged locally. Use power cable type DPYCYS-2 and DPYCYS-1.25 (both Japan Industrial Standard cables) or equivalent cables. Attach supplied power connector as shown below.

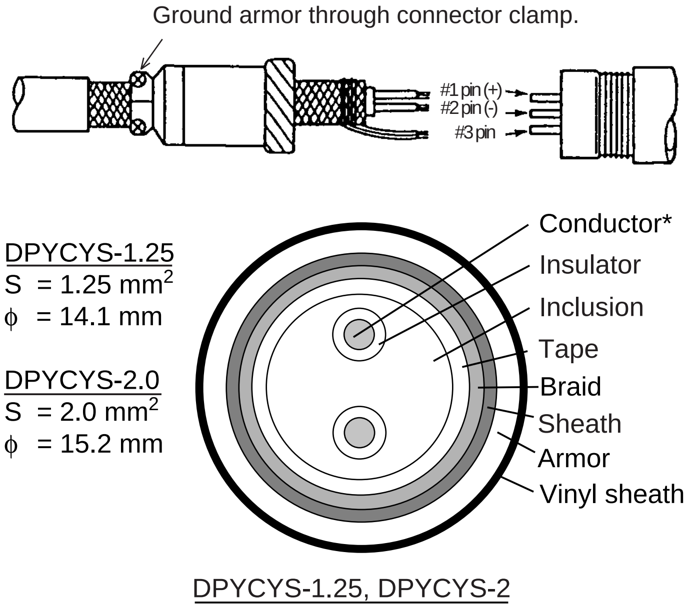


Figure 2-1 Power cable DPYCYS-1.25, DPYCYS-2

- Install the main switch for the sonar where it can be easily accessed. Turn off this switch when the sonar is not being used, to reduce power consumption and to prevent the transducer from slipping by vibration.
- For AC mains, use two rectifiers RU-1746B, one for the display and transceiver units and the other for the hull unit.

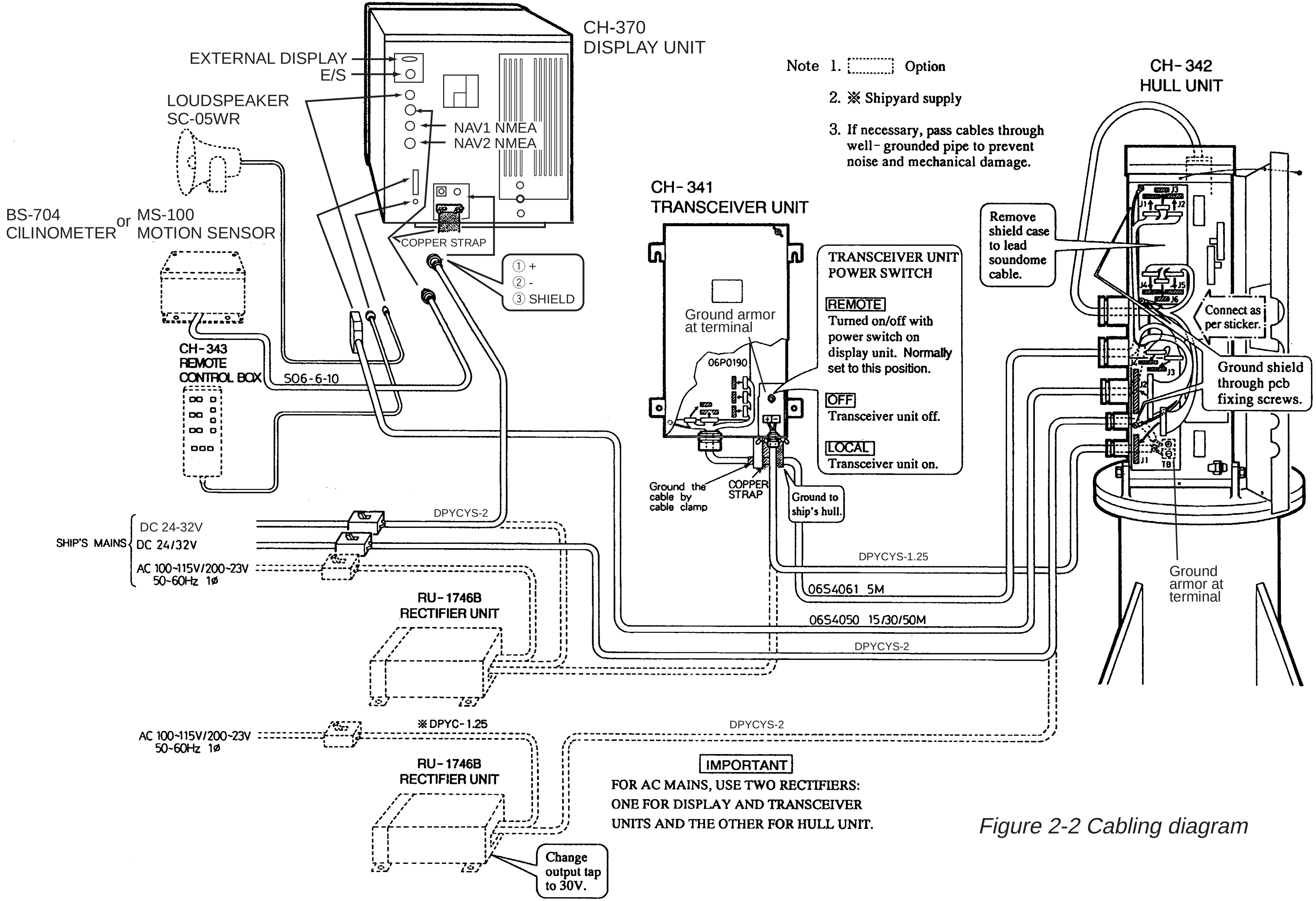
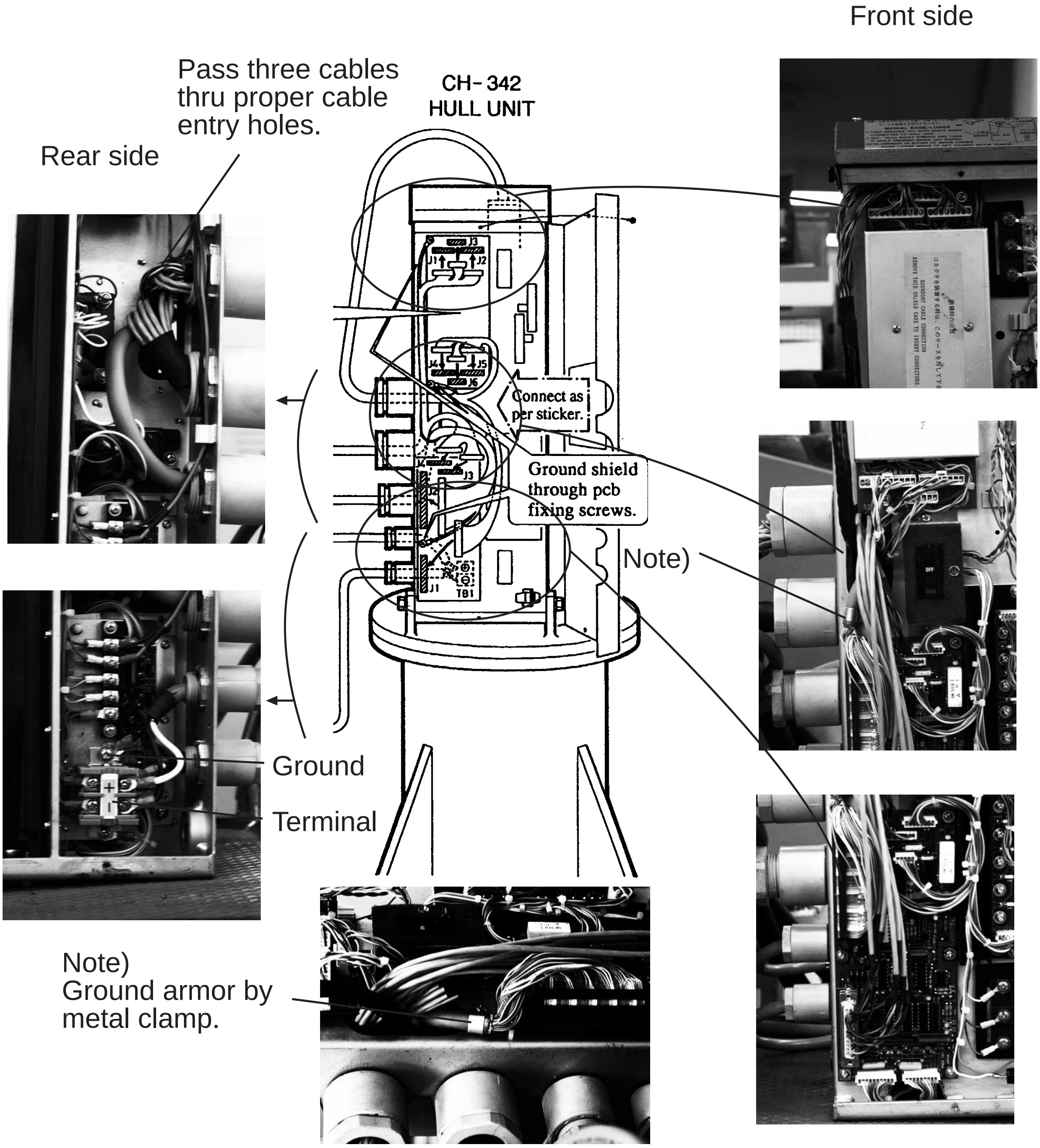


Figure 2-2 Cabling diagram


Front side
Pass three cables
thru proper cable
entry holes.
CH-342
HULL UNIT
Rear side
Connect as
per sticker.
Ground shield
through pcb
fixing screws.
Note)
Ground
Terminal
Note)
Ground armor by
metal clamp.

2.2 Synchronizing Transmission with Echo Sounder or Other Sonar

To synchronize transmission of the CH-37 with an echo sounder or other type of sonar, connect it as shown below.

Connections for synchronizing Tx with other E/S, sonar

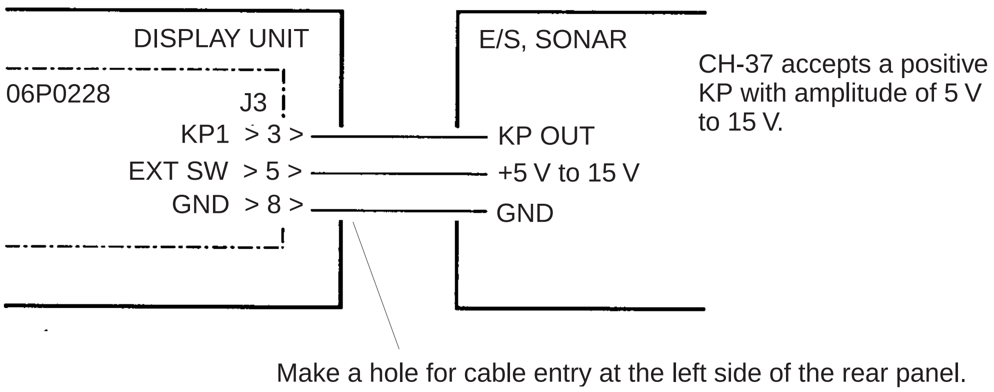


Figure 2-3 Connection of display unit to other sonar

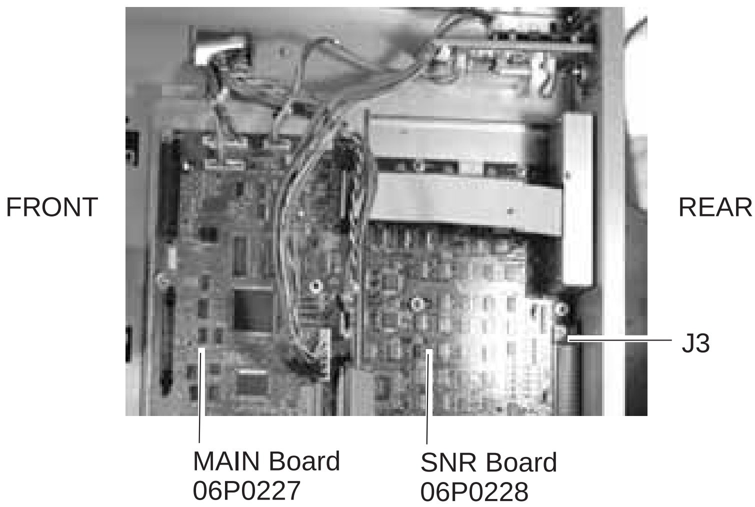


Figure 2-4 Display unit, cover removed, right side view

Menu setting

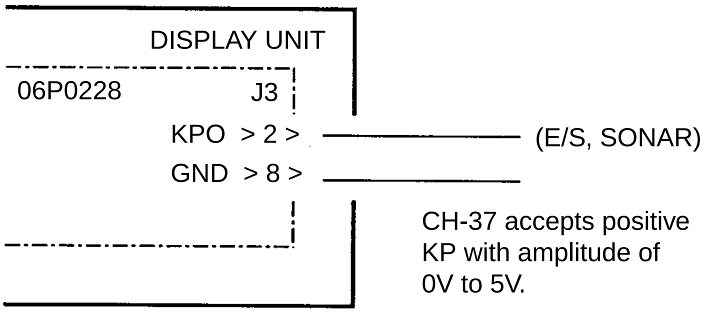
1. Press the MENU key.
2. Select SONAR at the top of the menu.

MENU :	SONAR	BOTTOM/3D	DUAL	E/S
TX RATE (MAX 10)	:	10		
TX PULSE LENGTH	:	LONG	SHORT	
TX OUTPUT POWER	:	A	B	C (MAX)
TX EXT SYNC	:	OFF	ON	
IR	:	OFF	ON	
STABILIZER	:	OFF	ON	
COLOR	:	16	8	
RES. COLOR	:	LOG	LINEAR	SQUARE
EXIT : PRESS MENU KEY				

Figure 2-5 SONAR menu

3. Set TX EXT SYNC to ON.
4. Press the MENU key.

Note: Outputting KP of CH-37 to other sonar, echo sounder



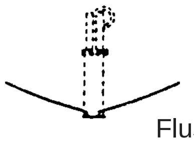
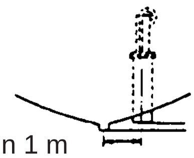
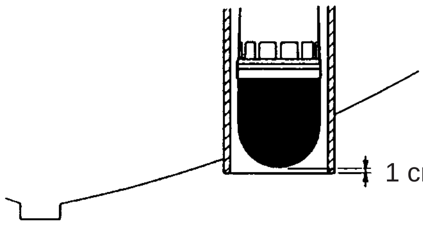
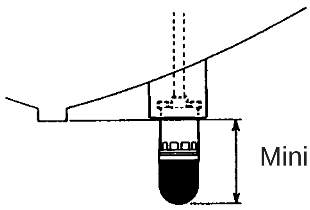
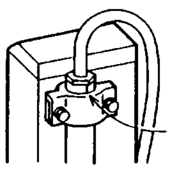
Outputting KP of CH-37 to other sonar, echo sounder

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ADJUSTMENTS

3.1 General Checks

Table 3-1 General checks

Check Item	Check point, Rating
Retraction tank level	On-keel Installation  Off-keel Installation 
Clearance between transducer and bottom of retraction tank when transducer is completely retracted by hand crank.	
Transducer travel (lowered by hand crank) **Note:** When checking, a clearance of approximately 1 meter is required under the bottom of the transducer.	
Manual raise/lower of transducer	Transducer can be raised/lowered smoothly with hand crank.
Transducer heading	 Bow mark inscribed on main shaft should face ship's bow.

(Continued on next page)

Table 3-1 General checks (con't)

Check Item	Check point, Rating
Wiring check	• All cables are correctly connected. • All lead wires are tightly fixed with contact pins or crimp-on lugs. • All screws are firmly fastened. • Cables are firmly secured. • Cable shields are properly grounded.
Rejecting source of noise and interference	• Noise generating machinery (motor, radio-telephone, TV set, etc.) are not placed nearby. • Magnetic devices are not placed in the vicinity of display unit.
Ground	Each unit is grounded with a copper strap.
Ship's mains voltage	Ship's mains voltage is stable 24 or 32 VDC.
Watertightness	Water should not leak from the main body flange or along the main shaft.
Heading alignment	A target is displayed on the correct bearing.

3.2 Adjustment of Transceiver Unit

Selecting audio frequency

Select audio frequency of 1000 Hz or 900 Hz by jumper connector JP2 on pcb 06P0192 in the transceiver unit. The default setting is 1000 Hz. Refer to Figure 3-1 for the location of JP2.

Signal offset adjustment

When noise appears on the screen, adjust R61 (offset) on pcb 06P0192. Turning R61 clockwise slices off low level signals in a similar way to the CLUTTER control on the display unit. (While the CLUTTER control on the display unit eliminates low level signals without changing signal level of strong signals, R61 shifts signal level of all signals.) When the offset adjustment is necessary, set R61 fully counterclockwise. Refer to Figure 3-1 for the location of R61.

Horizontal beamwidth

When the user wishes echoes to be displayed in high resolution, turn R40 on pcb 06P0192 clockwise to sharpen horizontal beamwidth. Do not turn it excessively clockwise, or an echo which should be displayed as a single solid mass may become hollow or split into smaller, fewer masses. Normally, set R40 at the mid-point of its travel.

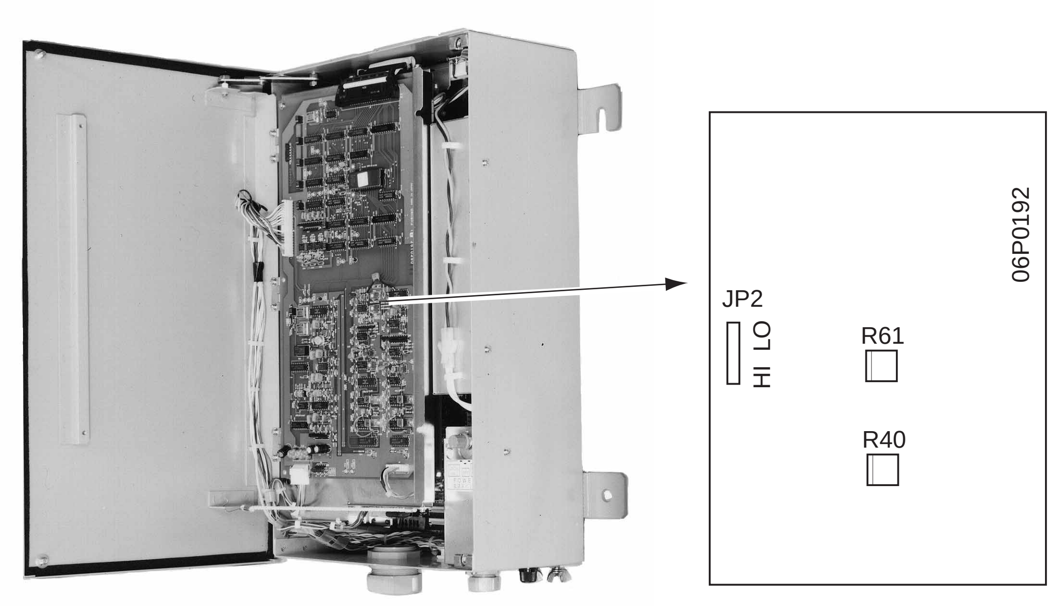


Photo No. 2058

Figure 3-1 Transceiver unit, cover opened

3.3 Heading Alignment

1. Locate a target (buoy, etc.) in the bow direction and display it on the screen at close range. The heading alignment is correct when the target is displayed at 12 o’clock on the screen.

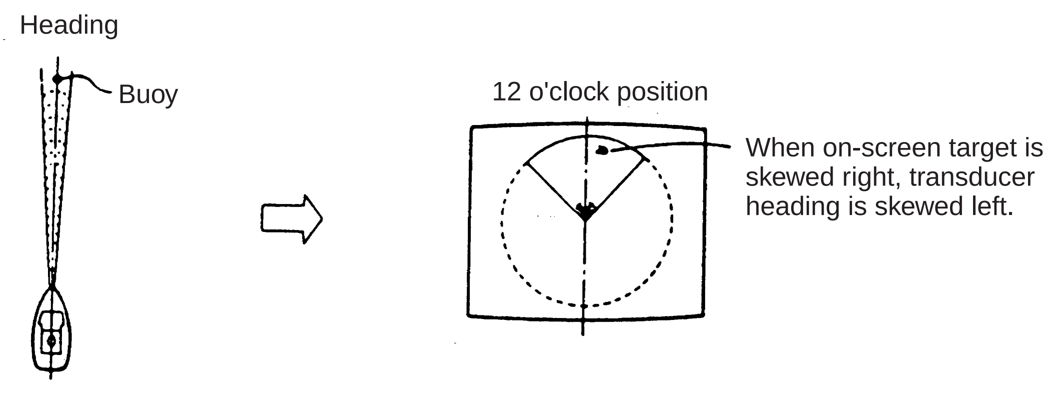


Figure 3-2 Checking heading alignment

2. When the heading alignment is incorrect, loosen four bolts on the shaft retainer and then rotate the main shaft to align heading.
3. Tighten bolts.

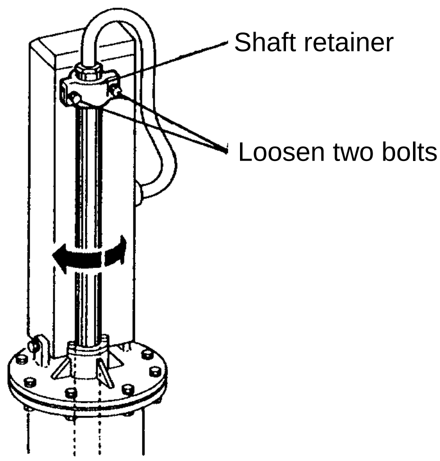


Figure 3-3 Main shaft

3.4 Adjustment of Motion Sensor, Clinometer

When the ship has a semi-permanent inclination, offset it as follows. Inclination of up to 10° can be corrected.

1. Turn on the power while pressing the MENU key. Release the MENU key when you hear a beep.
2. Select DISPLAY TEST.

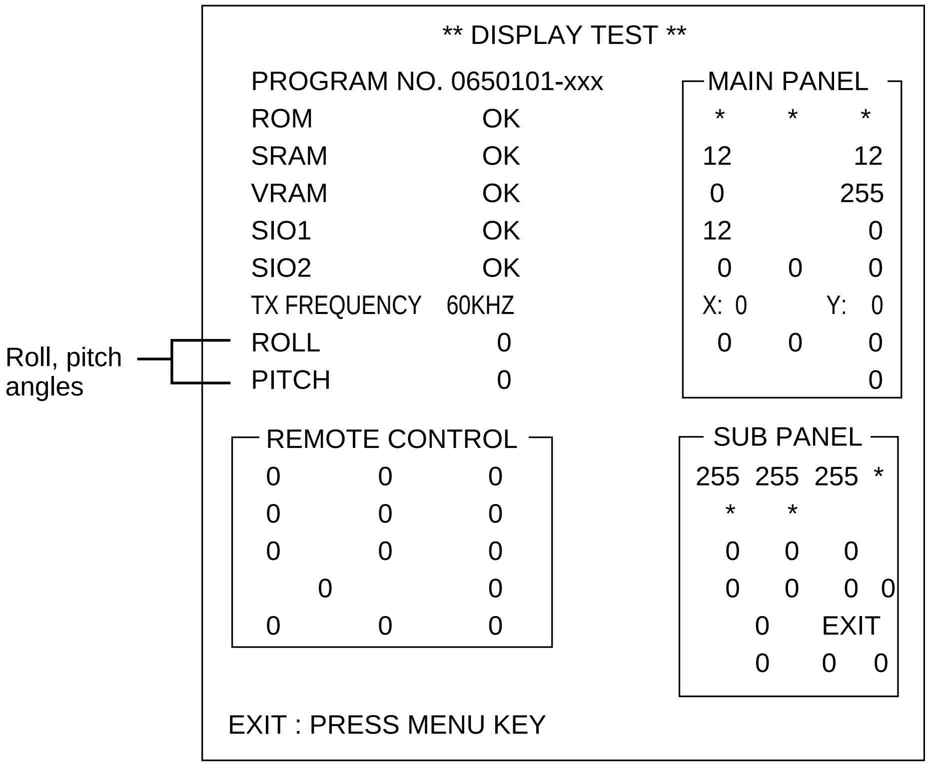
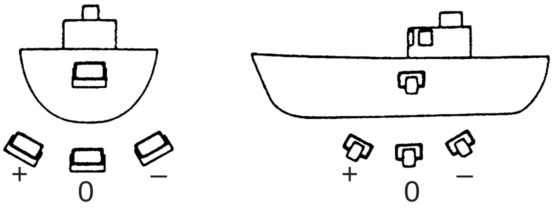


Figure 3-4 Display test results

3. Read ROLL/PITCH angles from the display.

4. By using a clinometer or other means, measure ship's semi-permanent inclination angle. Take the polarity of the angle as follows:



ROLL: Starboard up: +, Starboard down: -
PITCH: Stern up: +, Stern down: -

Figure 3-5 Measuring ship's semi-permanent inclination angle

5. Adjust the potentiometers R35 (ROLL) and R36 (PITCH) on the SNR Board (06P0228) in the display unit so angle readouts on the screen agree with the angles measured at step 4.

3.5 Soundome Painting

When the soundome is painted to keep marine life off the transducer, observe the following precautions:

- Use only anti-fouling paint type MARINE STAR 20 (Manufacturer: Chugoku Marine Paint Co., Ltd., Japan).
- Paint only the plastic portion of the dome. Painting the metal parts causes corrosion.

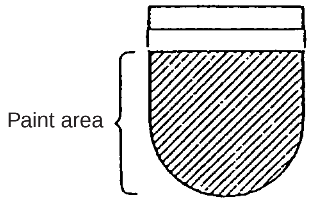


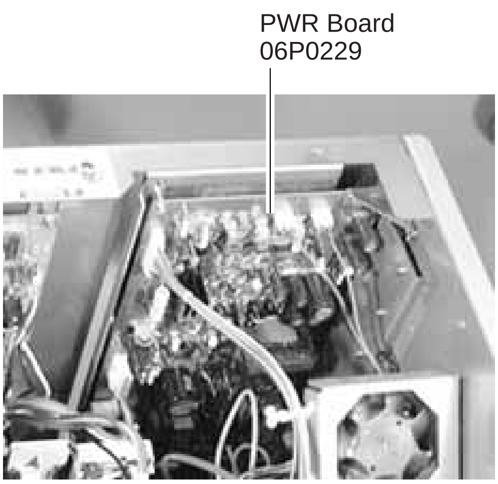
Figure 3-6 Where to paint the soundome

3.6 LED Status

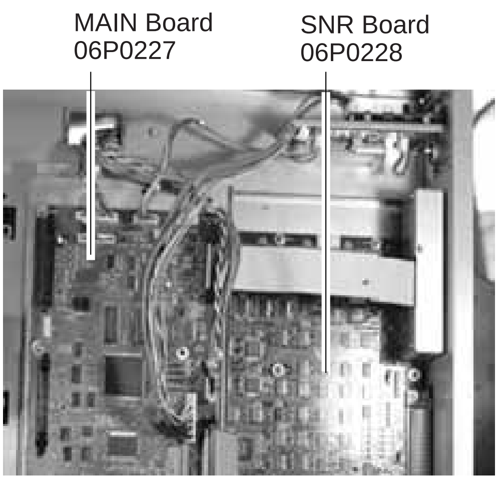
Display unit

Settings

Range: 400 m
Tx output power: C (max)
Tilt: 0°
Tx Rate: 10



Display unit, top view, cover removed



Display unit, side view, cover removed

Figure 3-6 Location of printed circuit boards in the display unit

Table 3-2 LEDs in the display unit

Off: ● Flickering: ◉ Lighting: o

PCB	LED			Remarks
	No.	Signal	Status	
MAIN 06P0227	CR2	+5V	o	
	CR4	+12V	o	
	CR5	-12V	o	

Table 3-2 LEDs in the display unit (con't)

Off: ● Flickering: ◉ Lighting: o

PCB	LED			Remarks
	No.	Signal	Status	
SNR Board 06P0228	CR4	L CONT	●	Off except when transducer is being lowered.
	CR7	TR CLK	◉	Flickers while transducer is being trained; off while transducer is stopped.
	CR9	TI CLK	◉	Flickers while TILT lever is pressed; off while TILT lever is released.
	CR12	TR 0°	◉	Lights momentarily when is trained to 0° direction.
	CR14	TR 180°	◉	Lights momentarily when is trained to 180° direction.
	CR16	TI +10°	●	Lights momentarily when transducer tilt angle is +10° or 90°. See * below.
	CR17	TI 190°	●	Lights momentarily when transducer tilt angle is +90° or 190°. See * below.
	CR20	HULL	o	Lights while ship's mains is supplied to hull unit.
	CR21	KP	◉	Flickers during transmission.
PWR Board 06P0229	CR21	+5V	o	
	CR22	+12V	o	
	CR25	IN HL	●	Lights when overvoltage protector operates.
	CR26	+115V	o	Power supply for color monitor
	CR27	-12V	●	Lights momentarily when overvoltage protector for -12V line operates.
	CR30	5V	●	Lights momentarily when overvoltage protector for 5V line operates.

* In normal operation there is no tilt angle of 190° or +10°.

Transceiver unit

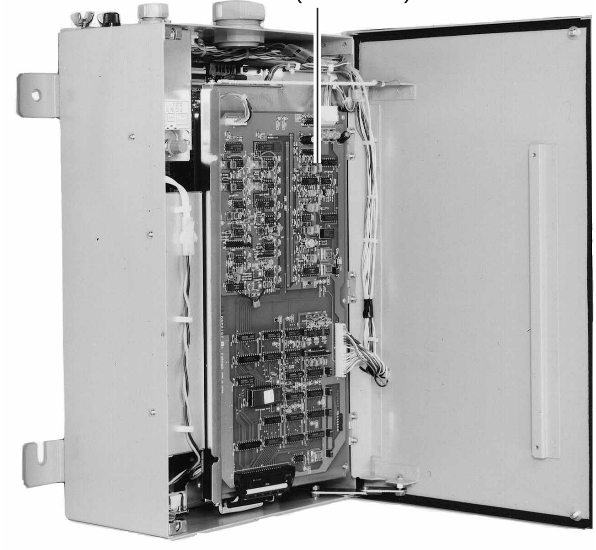


Photo No. 2058

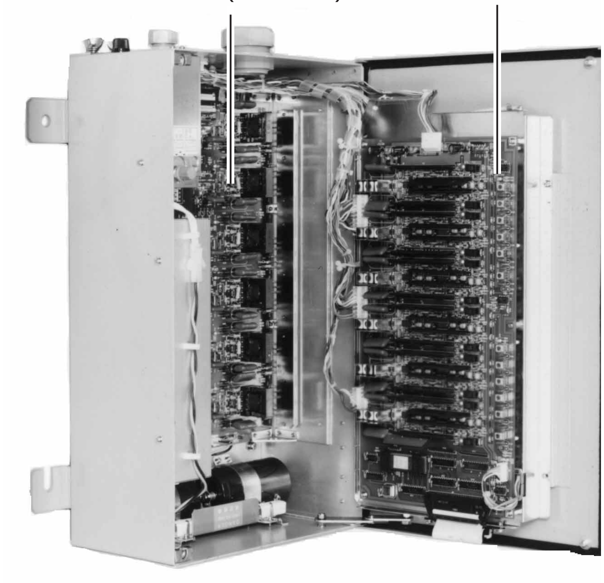


Photo No. 2057

Figure 3-7 Transceiver unit

Table 3-3 LEDs in the transceiver unit

Off: ● Flickering: ◉ Lighting: o

PCB	LED			Remarks
	No.	Signal	Status	
TX Board 06P0190	CR11	+5V	o	
	CR12	+12V	o	
	CR13	+130V	o	
	CR39	TX1	◉	Flickers during transmission.
	CR40	TX2	◉	" " "
	CR41	TX11	◉	" " "
	CR42	TX2	◉	" " "
	CR43	TX3	◉	" " "
	CR44	TX10	◉	" " "
	CR45	TX9	◉	" " "
	CR46	TX4	◉	" " "
	CR47	TX5	◉	" " "
	CR48	TX8	◉	" " "
	CR49	TX7	◉	" " "
	CR50	TX6	◉	" " "

Table 3-3 LEDs in the transceiver unit (con't)

Off: ● Flickering: ◉ Lighting: o

PCB	LED			Remarks
	No.	Signal	Status	
PRE Board 06P0191	CR1	+5V	o	
	CR2	+12V	o	
	CR3	-12V	o	
MAIN Board 06P0192	CR1	+5V	o	
	CR2	+12V	o	
	CR3	-12V	o	
	CR4	AUD	◉	Flickers by audio slgnal.
	CR16	FS	o	FS signal
	CR17	TVG	◉	Digital TVG signal
	CR18	LCLK	o	TVG signal latch clock
PWR Board 06P0172	CR9	-12V	o	
	CR10	+12V	o	
	CR11	+5V	o	
	CR12	+130V	o	

Hull unit

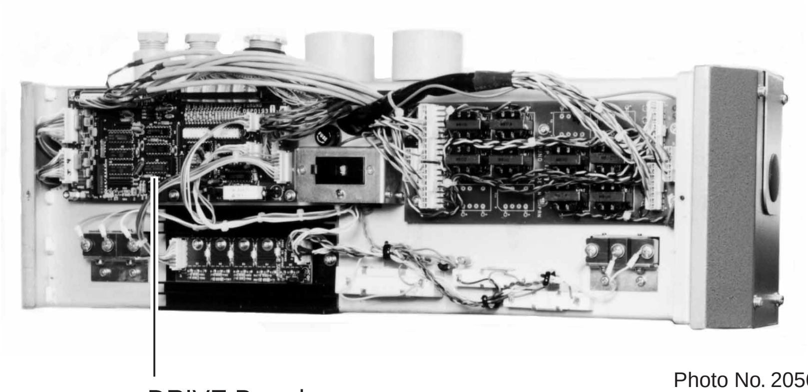


Figure 3-8 Hull unit

Table 3-4 LEDs in the hull unit

Off: ● Flickering: ◉ Lighting: o

PCB	LED			Remarks
	No.	Signal	Status	
DRIVE Board 06P0193	CR12	TR0°	◉	Lights momentarily when transducer is trained in 0° direction.
	CR13	TR180°	◉	Lights momentarily when transducer is trained in 180° direction.
	CR14	TI +10°	●	Lights momentarily when transducer is tilted to +10° or 90°.
	CR15	TI 90°	●	Lights momentarily when transducer is tilted to 90°.
	CR16	+13V	o	
	CR18	TR CLK	o	Lights when transducer is being trained.
	CR19	TI CLK	●	Lights while TILT level is pressed; goes off when TILT lever is released.
	CR20	+13V	o	

CHANGING SPECIFICATIONS

4.1 System Menu

1. Turn on the power while pressing the MENU key. Release the key when you hear a beep.
2. Select SYSTEM SETTING.

** SYSTEM SETTING **

3D DISPLAY	:	[OFF]	ON	
SHIP'S POSITION	:	[OFF]	L/L	LOP
CURRENT DATA	:	[OFF]	ON	
DEPTH DATA	:	[OFF]	ON	
HEADING INDICATION	:	[OFF]	TRUE	AZ
NORTH MARK	:	[OFF]	ON	
TRACK	:	[10R]	20R	
HDG/SPD DATA	:	[NAV]	CI	
NAV DATA	:	[GPS]	LORAN C	LORAN A
		DR	DECCA	OTHERS
DATA FORMAT FOR NAV2	:	[NMEA]	CIF	
CIF BAUD RATE	:	1200	2400	[4800]
TVG CORRECTION	:	[OFF]	1/2	1
UNIT	:	[m]	ft fa	HIRO
V-MODE MANUAL TRAIN	:	[HALF]	FULL	
DEGAUSSING INTERVAL	:	[30] SEC		
FACTORY SETTING	:	[NO]	YES	

EXIT : PRESS MENU KEY

Figure 4-1 SYSTEM SETTING menu

3. Select items and options with the arrow keys.
4. To return to normal operation, reset the power.

See the next page for system setting menu description.

Table 4-1 System setting menu description

Item	Description
3D DISPLAY	Turns 3D mode on/off.
SHIP'S POSITION	Turns position indication on/off and selects position format; latitude and longitude or Loran LOP.
CURRENT DATA	Turns current (tide) data on/off.
DEPTH DATA	Turns depth indication on/off.
HEADING DISPLAY	Turns heading indication on/off and selects its format; true bearing or azimuth (16 azimuth bearing).
NORTH MARK	Turns north marker on/off.
TRACK	Selects length of courseline plotting; 10R (ten times the range in use) or 20R (twenty times the range in use).
HDG/SPD DATA	Selects source of data to be used to plot courseline; NAV (Navigator), CI (Current Indicator).
NAV DATA	Selects source of position data; GPS, LORAN C LORAN A, DR, DECCA, OTHERS.
DATA FORMAT FOR NAV2	Selects data format for nav data; CIF (FURUNO) or NMEA.
CIF BAUD RATE	Selects baud rate of CIF data; 1200, 2400, 4800 bps.
TVG CORRECTION	Changes TVG curve to compensate for absorption attenuation of ultrasonic wave in water. OFF, Standard TVG curve, 1/2, 1/2 of theoretical absorption value added to TVG curve, 1, Full theoretical absorption value added to TVG curve.
UNIT	Selects unit of depth measurement. m, meters; ft, feet; fa, fathoms, HIRO.
V-MODE MANUAL TRAIN	Selects manual training sector width for the vertical fan mode. Half, half circle, Full, full circle.
DEGAUSSING INTERVAL	Enter interval at which to have the screen degaussed. OFF degausses the screen at the maximum interval.
FACTORY SETTING	Yes restores default system menu settings.

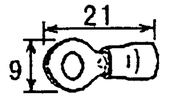
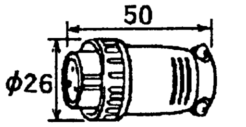
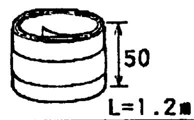
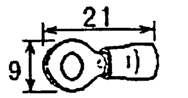
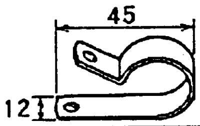
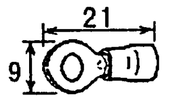
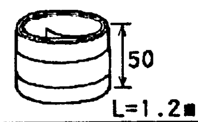
FURUNO

CODE NO.	006-551-160	06AR-X-9401 -0
TYPE	CP06-01101	1/1

工事材料表
INSTALLATION MATERIALS

CH-37 カラーセクタークキャニング゛ソナー

COLOR SECTOR SCANNING SONAR

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	圧着端子 CRIMP-ON LUG		FV2-4A ｱｵ CODE NO. 000-538-118	4	指示器用 FOR DISPLAY UNIT
2	ｺﾈｸﾀ CONNECTOR		NJC-203-PF CODE NO. 000-506-703	1	指示器用 FOR DISPLAY UNIT
3	ｱｰｽ板 COPPER STRAP		WEA-1004-0 CODE NO. 500-310-040	1	指示器用 FOR DISPLAY UNIT
4	圧着端子 CRIMP-ON LUG		FV2-4A ｱｵ CODE NO. 000-538-118	6	上下装置用 FOR HULL UNIT
5	ﾒﾀﾙｹｰﾌﾞﾙｸﾗﾝﾌﾟ METAL CABLE CLAMP		AL-12 CODE NO. 000-137-934	1	送受信機用 FOR TRANCEIVER UNIT
6	圧着端子 CRIMP-ON LUG		FV2-4A ｱｵ CODE NO. 000-538-118	2	送受信機用 FOR TRANCEIVER UNIT
7	ｱｰｽ板 COPPER STRAP		WEA-1004-0 CODE NO. 500-310-040	1	送受信機用 FOR TRANCEIVER UNIT

C1303-M01- A

FURUNO ELECTRIC CO., LTD

（略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

FURUNO

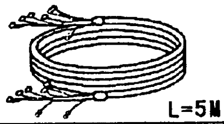
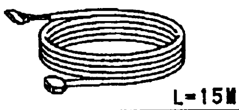
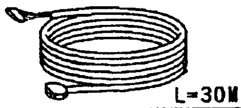
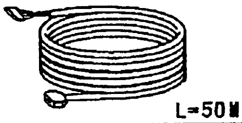
CODE NO.		06AR-X-9402 -0
TYPE		1/1

工事材料表

INSTALLATION MATERIALS

CH-37 カラーセクタースキャニングソナー

COLOR SECTOR SCANNING SONAR

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	ケーブル組品 CABLE ASSY.	 L=5M	06S4061-1 *5M* CODE NO. 000-126-159	1	
2	ケーブル組品 CABLE ASSY.	 L=15M	06S4076 *15M* CODE NO. 000-141-034	1	
3	ケーブル組品 CABLE ASSY.	 L=30M	06S4076 *30M* CODE NO. 000-141-035	1	
4	ケーブル組品 CABLE ASSY.	 L=50M	06S4076 *50M* CODE NO. 000-141-036	1	

C1303-M02- A

FURUNO ELECTRIC CO., LTD

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO

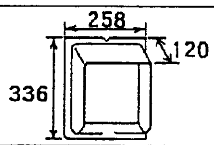
CODE NO.	002-007-280	10B0-X-9501 -4
TYPE	FP02-02610	1/1

付属品表

ACCESSORIES

CSH-5/5MARK-2/8 カラースキャニングソナー
CH-37 カラーセクタースキャニングソナー

COLOR SCANNING SONAR
COLOR SECTOR SCANNING SONAR

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	フード HOOD		10-044-0032-1 CODE NO. 100-109-251	1	指示器用 FOR DISPLAY UNIT

DWG NO. C1303-F01- B

FURUNO ELECTRIC CO ., LTD

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO

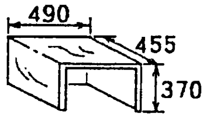
CODE NO.		06AR-X-9503 -0
TYPE		1/1

付属品表

ACCESSORIES

CH-37 カラーセクタースキャニングソナー

COLOR SECTOR SCANNING SONAR

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	ビニールカバー VINYL COVER		10-026-0601 CODE NO. 000-800-199	1	

C1303-F03- A

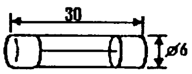
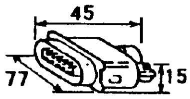
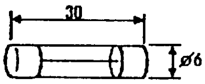
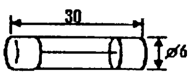
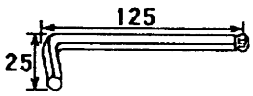
FURUNO ELECTRIC CO ., LTD

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO

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TYPE	SP06-01000	BOX NO. P

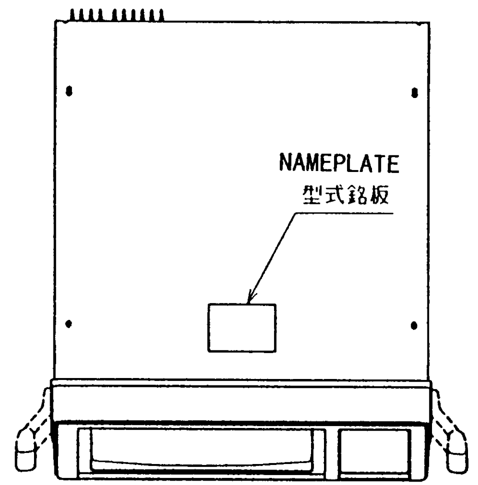
SHIP NO.	SPARE PARTS LIST FOR	U S E	SETS PER VESSEL
	CH-37 ｶﾗｰｽｷｬﾆﾝｸﾞｿﾅｰ COLOR SCANNING SONAR		

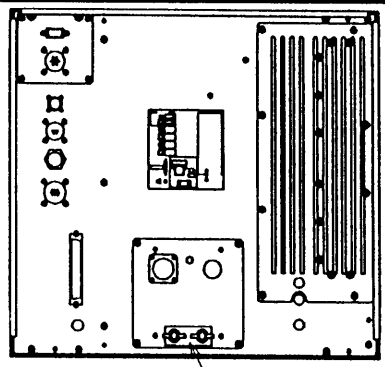
ITEM NO.	NAME OF PART	OUTLINE	DWG. NO. OR TYPE NO.	QUANTITY WORKING PER SET	QUANTITY WORKING PER VES	SPARE	REMARKS/CODE NO.
1	ﾋｭｰｽﾞ FUSE		FGBO-A 4A AC125V	1		5	000-127-233
2	ｺﾈｸﾀ CONNECTOR		57-30500	1		1	000-504-000
3	ﾋｭｰｽﾞ FUSE		FGBO 7A AC125V	1		5	000-549-013
4	ﾋｭｰｽﾞ FUSE		FGBO 10A AC125V	1		5	000-549-065
5	ﾎﾞｰﾙﾚﾝﾁ BALL WRENCH		TWB-30		1		000-803-168

MFR'S NAME	FURUNO ELECTRIC CO.,LTD	DWG NO.	C1303-P01- A	1/1

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO

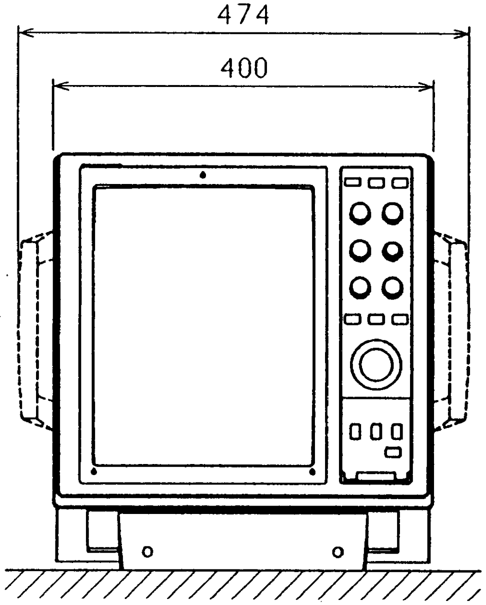


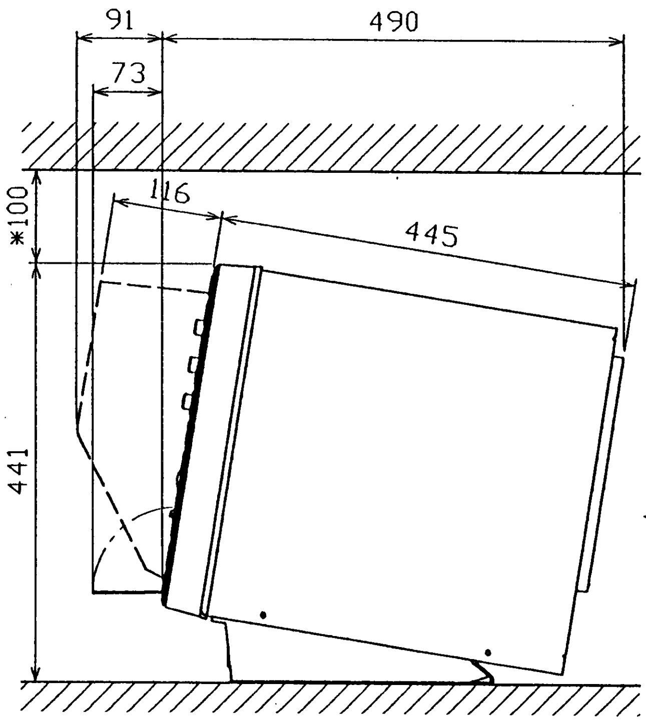


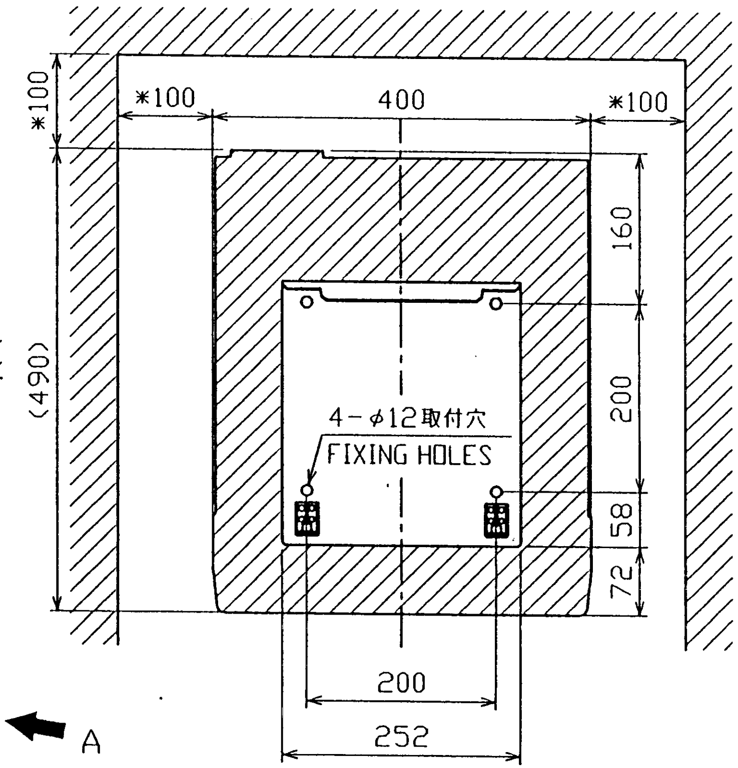
矢視A（背面図）VIEW A(REAR)

範囲 DIMENSIONS	公差 TOL.
L≦50	±1mm
50<L≦100	±2mm
100<L≦500	±3mm

表 1





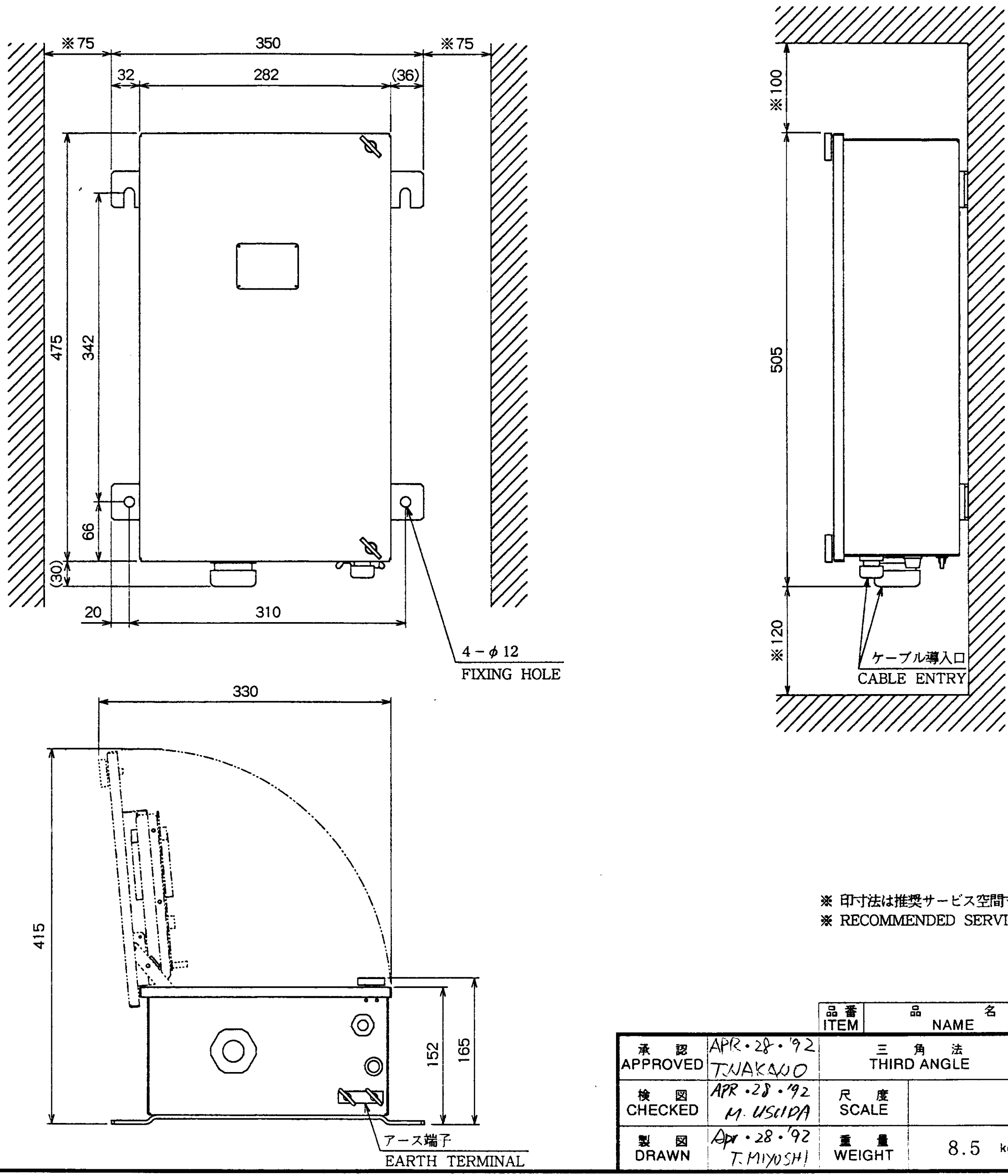


注 記 1） 指定外寸法公差は表1による
2） ※印寸法は最小サービス空間寸法とする

NOTE
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
2. *: RECOMMENDED SERVICE CLEARANCE.

DRAWN May 8 '98 T.YAMASAKI		TYPE CH-370
CHECKED		名称 指示器
APPROVED		外寸図
SCALE 1/8	MASS 30 kg	APPLICABLE TO; (MODEL) CH-37
BLOCK NO.		NAME DISPLAY UNIT
DWG NO. C1303-G01- A	06-020-1000- G1	OUTLINE DRAWING

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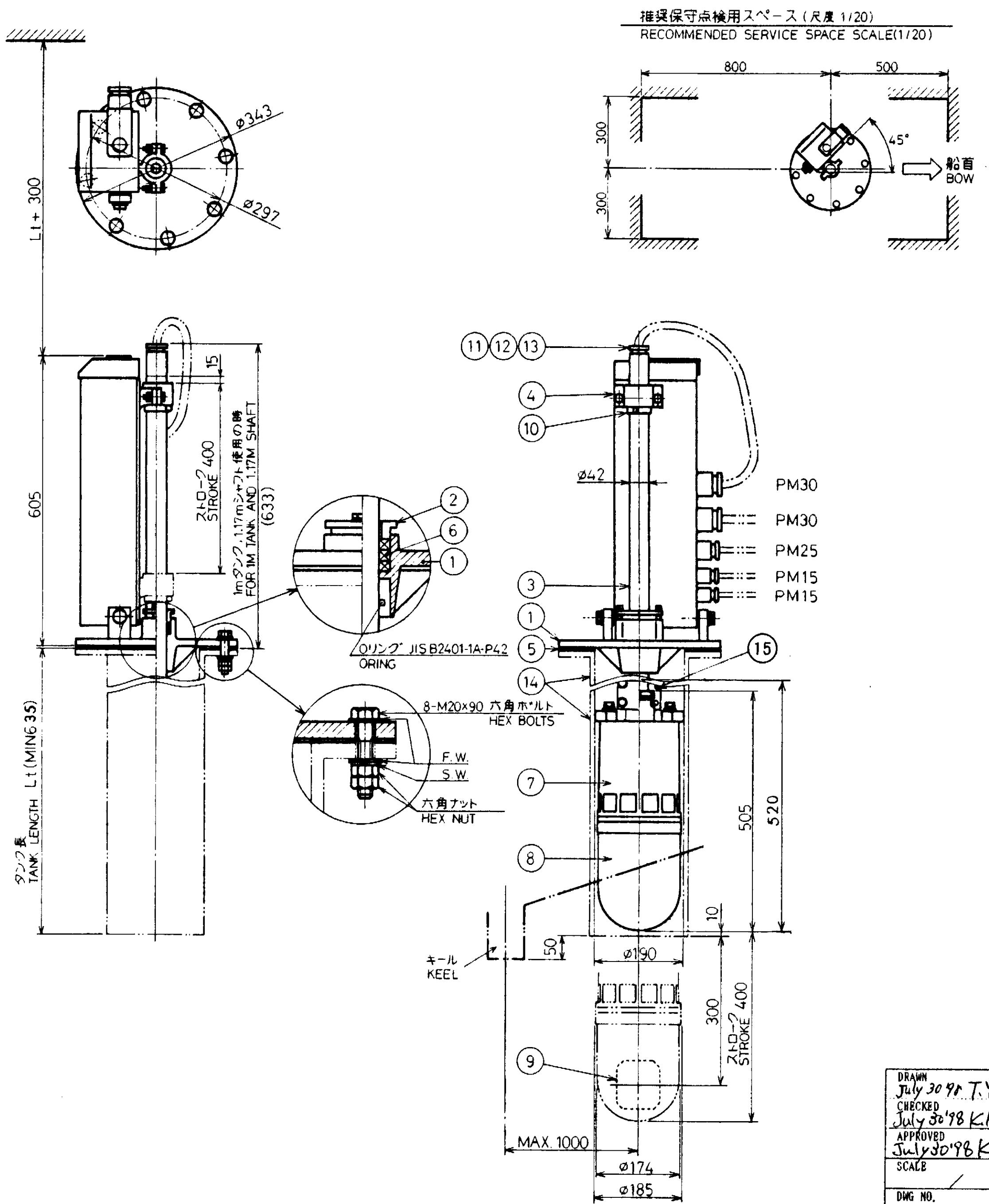


※ 印寸法は推奨サービス空間寸法。
※ RECOMMENDED SERVICE SPACE.

品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG. NO.	摘要 REMARKS

承認 APPROVED	APR・28・'92 T.NAKANO	三角法 THIRD ANGLE	名称 TITLE CH-341	送受信装置 TRANSCEIVER UNIT
検図 CHECKED	APR・28・'92 M. USCIDA	尺度 SCALE		
製図 DRAWN	Apr・28・'92 T. MIYOSHI	重量 WEIGHT 8.5 kg	図番 DWG.NO	C1282 － G02 － A

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注
NOTES :

1) 装備位置は船首から1/3（小型船では1/2）程度でキールから1m以内とする。
2) 上下シャフトの長さ（Ls）は、格納タンクの長さ（Lt）に、17mmを加えた値で切断すること。

Ls = Lt + 110 (mm)

3) 上下装置の船首方向は左図の矢印（⇨）で示す。
4) ドーム内部保守点検のため、上下装置上部には図示のスペースを設けるか、障害となる天井等に300mm × 300mm程度の角穴を明ける。

1) THE HULL UNIT IS GENERALLY PLACED ABOUT 1/3 (1/2 IN CASE OF SMALL BOAT) OF THE SHIP'S LENGTH FROM THE BOW ON THE FORE-AFT LINE AND BESIDE THE KEEL LINE (LESS THAN 1000mm FROM KEEL LINE).
2) THE MAIN SHAFT SHOULD BE CUT TO A LENGTH (Ls) GIVEN BY THE FOLLOWING EQUATION.

Ls = Lt + 110 (mm) Lt : TANK LENGTH

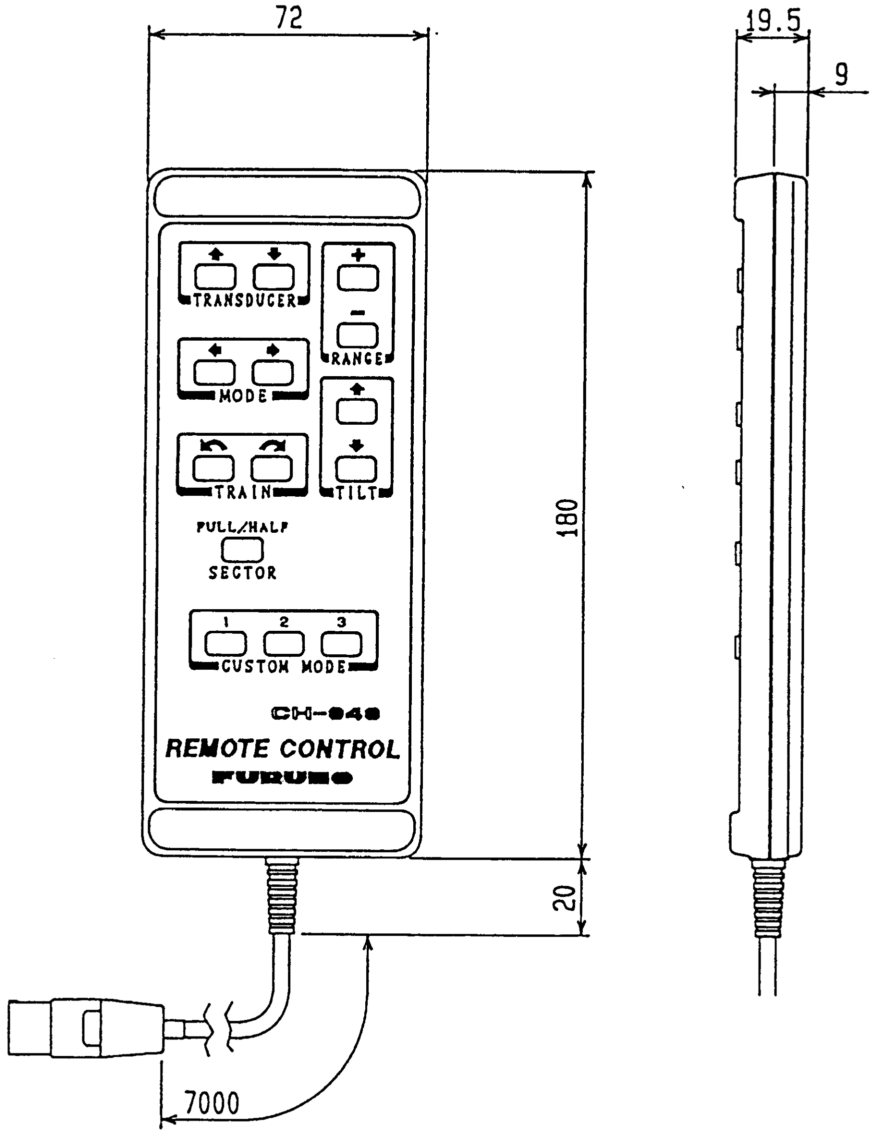
3) ⇨ (ARROW) SHOWS FORE FOR HULL UNIT AND TANK.
4) IF THE OVERHEAD CLEARANCE SHOWN IN THE DRAWING IS NOT OBTAINED, MAKE A HOLE OF 300mm × 300mm ON THE CEILING FOR FACILITATING INSTALLATION AND FUTURE SOUNDOME SERVICE.

品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG. NO.	摘要 REMARKS
15	シャフト保護金具 SHAFT RETAINER		1		
14	格納タンク RETRACTION TANK				
13	ガスケット GASKET		1		
12	座金 WASHER		2		
11	締付グランド CABLE GLAND		1		
10	ジュビリークリップ FASTENING BAND		1		
9	送受波器 TRANSDUCER		1		
8	ドーム (D) SOUNDOME (D)		1		
7	ドーム (U) SOUNDOME (U)		1		
6	グリスコットン GREASE COTTON		1		
5	フランジパッキン GASKET		1		
4	パイプクランプ PIPE CLAMP		1		
3	上下シャフト MAIN SHAFT		1		
2	グリスコットン押え台 GREASE COTTON RETAINER		1		
1	フランジ MAIN BODY FLANGE		1		

DRAWN July 30 '98 T. YAMASAKI		TYPE	CH-342
CHECKED July 30 '98 K. Kusunoki		名称	上下装置
APPROVED July 30 '98 K. Kusunoki	CH-37 CH-34		外寸図
SCALE /	MASS kg	APPLICABLE TO; (MODEL)	BLOCK NO.	NAME HULL UNIT
DWG NO. C1282-G03- C			OUTLINE DRAWING

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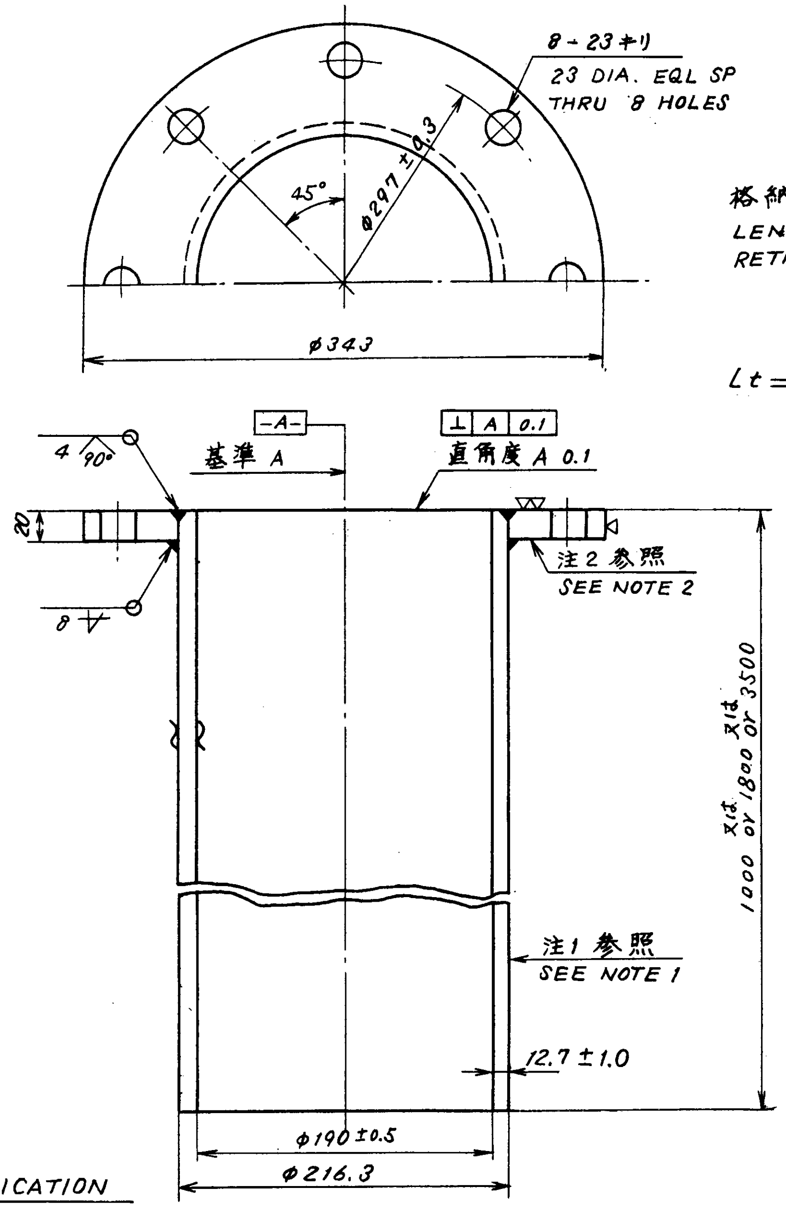
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品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG. NO.	摘要 REMARKS

承認 APPROVED	・ ・	三角法 THIRD ANGLE		名称 TITLE	CH-343 リモートコントロール REMOTE CONTROL
検図 CHECKED	・ ・	尺度 SCALE	1 / 2		
製図 DRAWN	・ ・	重量 WEIGHT	0.38 kg	図番 DWG.NO	C1282 − G04 − A

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格納タンクの長さ；
LENGTH OF
RETRACTION TANK；

Lt = ______ mm

製作時の注意
NOTE FOR FABRICATION

1. 材料はSTPG38－E－C（圧力配管用炭素鋼鋼管 冷間仕上電気抵抗溶接鋼管 呼び径 200A スケジュール 80）を使用のこと。
2. 材料は SS41P を使用のこと。
3. タンク側面は大日本ペイント速乾鉛丹ペイントを2回塗布のこと。
4. タンク内面はビニールAF（中国塗料）を2回塗布のこと。
5. タンク上面は塗装しないこと。

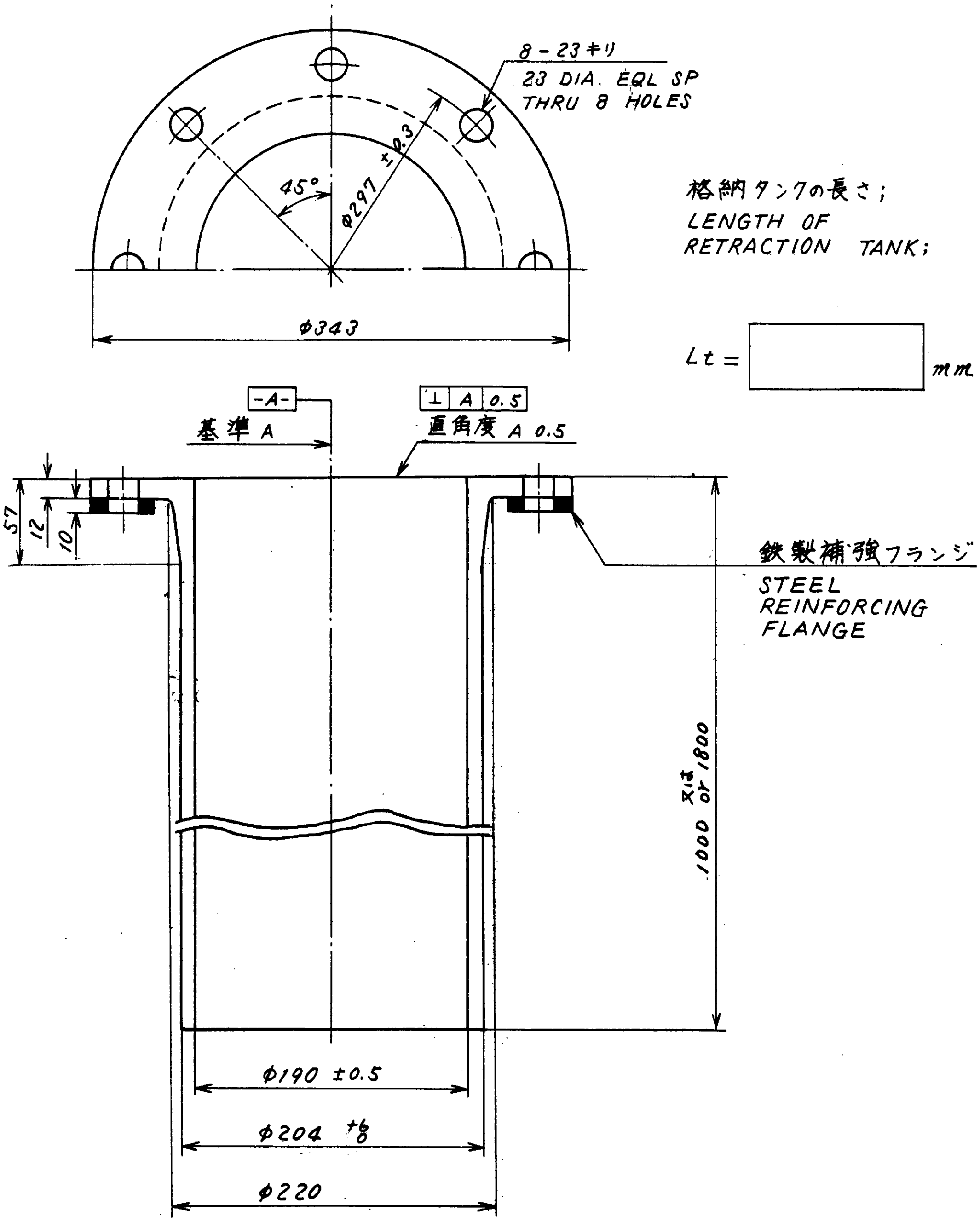
1. USE STPG－38－E－C (8"SCHEDULE 80, JIS G3454, CARBON STEEL PIPE FOR PRESSURE SERVICE).
2. USE SS41P (JIS G3101, ROLLED STEEL FOR GENERAL STRUCTURE).
3. GIVE TWO COATS OF FAST-DRYING RED LEAD PAINT ON OUTSIDE OF TANK.
4. GIVE TWO COATS OF VINYL PAINT AF OR ANTI-FOULING PAINT ON INSIDE OF TANK.
5. DO NOT PAINT ON SURFACE OF FLANGE.

単位 UNIT: mm

品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG. NO.	摘要 REMARKS

承認 APPROVED	NOV. 9 .'77 (signature)	三角法 THIRD ANGLE PROJECTION	名称 TITLE: 鉄製格納タンク外観図 STEEL RETRACTION TANK OUTLINE DRAWING
検図 CHECKED	NOV. 8 .'77 (signature)	尺度 SCALE: 1/5	
製図 DRAWN	'77 . 6 .28 (signature)	重量 WEIGHT: 1000mm : 73, 1800mm : 123 kg, 3500mm : 231	図番 DWG. NO. C1229-006-G

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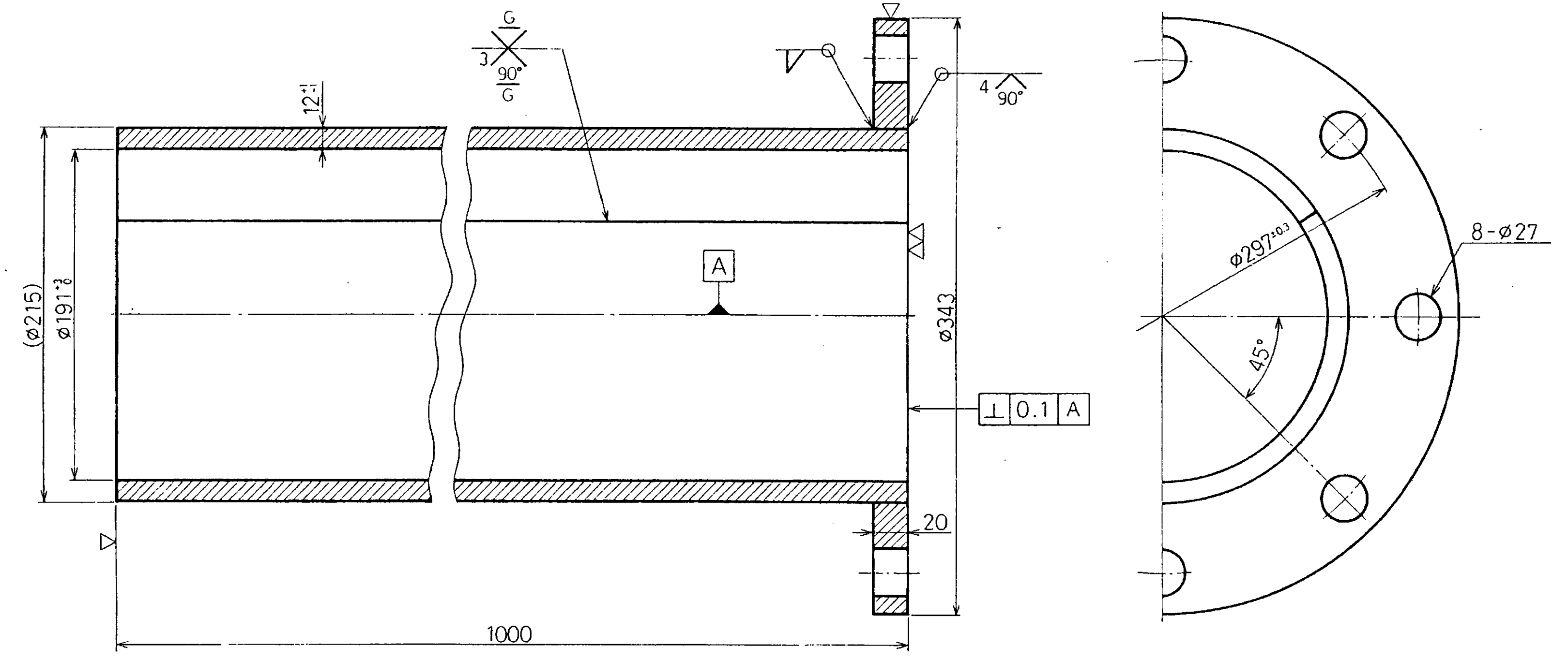


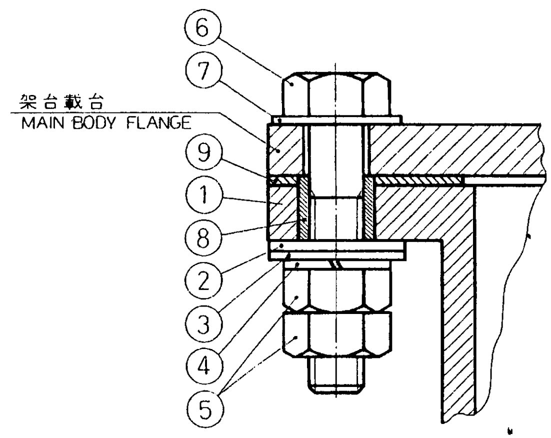
単位 UNIT : mm

品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG. NO.	摘要 REMARKS

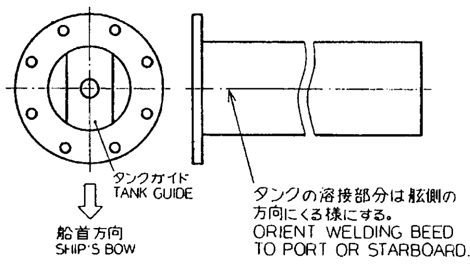
承認 APPROVED		三角法 THIRD ANGLE PROJECTION		名称 TITLE	FRP製格納タンク外観図 FRP RETRACTION TANK OUTLINE DRAWING
検図 CHECKED	July. 18. '78	尺度 SCALE	1/5		
製図 DRAWN	July. 18. '78 N. Maeda	重量 WEIGHT	1000mm: 20kg 1800mm: 27kg	図番 DWG. NO.	C1229-007-E

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a) 格納タンク装備要領
ORIENTATION OF TANK



注）架台，格納タンクに他の電気機器のアースを取らないこと。

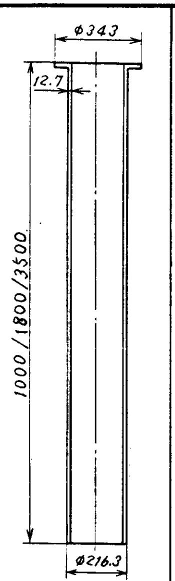
NOTE. DO NOT CONNECT GROUNDING WIRE OF OTHER EQUIPMENT TO RETRACTION TANK.

品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS
9	フランジパッキン GASKET	CR	1	SHJ-0009-1	
8	絶縁パッキン (2) INSULATION PACKING (2)	CR	8	MS-1000-68	
7	平座金 FLAT WASHER	SUS304	8	M20用	
6	六角ボルト HEX. BOLT	SUS304	8	M20 × 100	
5	六角ナット HEX. NUT	SUS304	8	M20	
4	スプリングワッシャ SPRING WASHER		8		
3	ワッシャ WASHER	SUS304	8	SHG-0002	
2	絶縁板 (2) INSULATION WASHER (2)	CR	8	SHG-0004	
1	格納タンク (アルミ) RETRACTION TANK	A5083	1	10-044-2601	

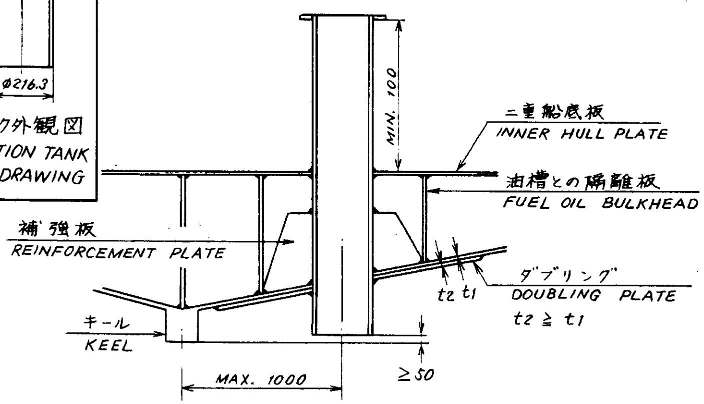
承認 APPROVED	DEC. 27. '90 T. NAKANO	三角法 THIRD ANGLE PROJECTION		名称 TITLE	格納タンク(アルミ)外寸図 RETRACTION TANK (ALUMINUM)
検図 CHECKED	DEC. 27. '90 T. MIYOSHI	尺度 SCALE	1/3		
製図 DRAWN	DEC. 27. '90 M. USUDA	重量 WEIGHT	35 kg	図番 DWG. NO.	C1273-G09-A

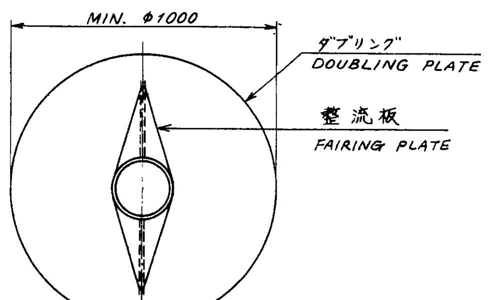
CSH-5

D-6A



格納タンク外観図
RETRACTION TANK OUTLINE DRAWING





1. 格納タンクの装備は次の条件を満すこと。
   1) 取付位置は船首から1/3（小型船の場合は1/2）程度。
   2) キールより1m以内。
   3) フランジのボルト締めのためフランジ下面と障害物（二重船底等）との間に100mm以上のスペースがあること。
   4) タンクの先端はキールの先端より50mm上であること。
   5) タンクのフランジ面は標準走航時に水平であること。

2. 格納タンクの周辺の船底板に径1000程度のダブリングを施すこと。
3. 格納タンクの突出部分に網除けを兼ねた整流板を設けること。
4. 必要に応じて格納タンク周辺に油槽との隔離板をめぐらせること。
   またタンク周囲、3.4ヶ所で船底板に向けて補強板を溶接すること。

注：強度及び水密性について、船主、造船所担当者、施工者の間で充分協議し、取付位置、方法、材料等を決定すること。

1. SATISFY THE FOLLOWING CONDITIONS IN DECIDING THE RETRACTION TANK MOUNTING SITE.
   1) ABOUT 1/3 (1/2 IN CASE OF SMALL BOAT) OF SHIP'S LENGTH FROM BOW ON FORE-AFT LINE.
   2) WITHIN 1000 mm FROM KEEL LINE.
   3) ALLOW CLEARANCE OF MORE THAN 100 mm BENEATH TANK FLANGE TO FACILITATE BOLTING.
   4) KEEP LOWEST END OF TANK 50 mm ABOVE BOTTOM OF KEEL.
   5) TANK FLANGE SHOULD BE EXACTLY HORIZONTAL WHEN SHIP IS NORMALLY TRIMMED.

2. DOUBLING PLATE OF ABOUT 1000 mm IN DIA. SHOULD BE INSTALLED BY THE SHIPYARD.
3. FAIRING PLATE (NET PROTECTOR) SHOULD BE INSTALLED AROUND THE PARTS OF THE TANK PROTRUDING FROM THE HULL BOTTOM BY THE SHIPYARD.
4. IF REQUIRED, FUEL OIL BULKHEAD AND REINFORCEMENT PLATE SHOULD BE INSTALLED BY THE SHIPYARD.

CAUTION: DISCUSSION SHOULD TAKE PLACE AND AGREEMENT BE REACHED WITH THE SHIPYARD FOR SUFFICIENT REINFORCEMENT AND WATERTIGHTNESS OF THE HULL TO COMPLY WITH THE REGULATIONS CONCERNED.

単位 UNIT: mm

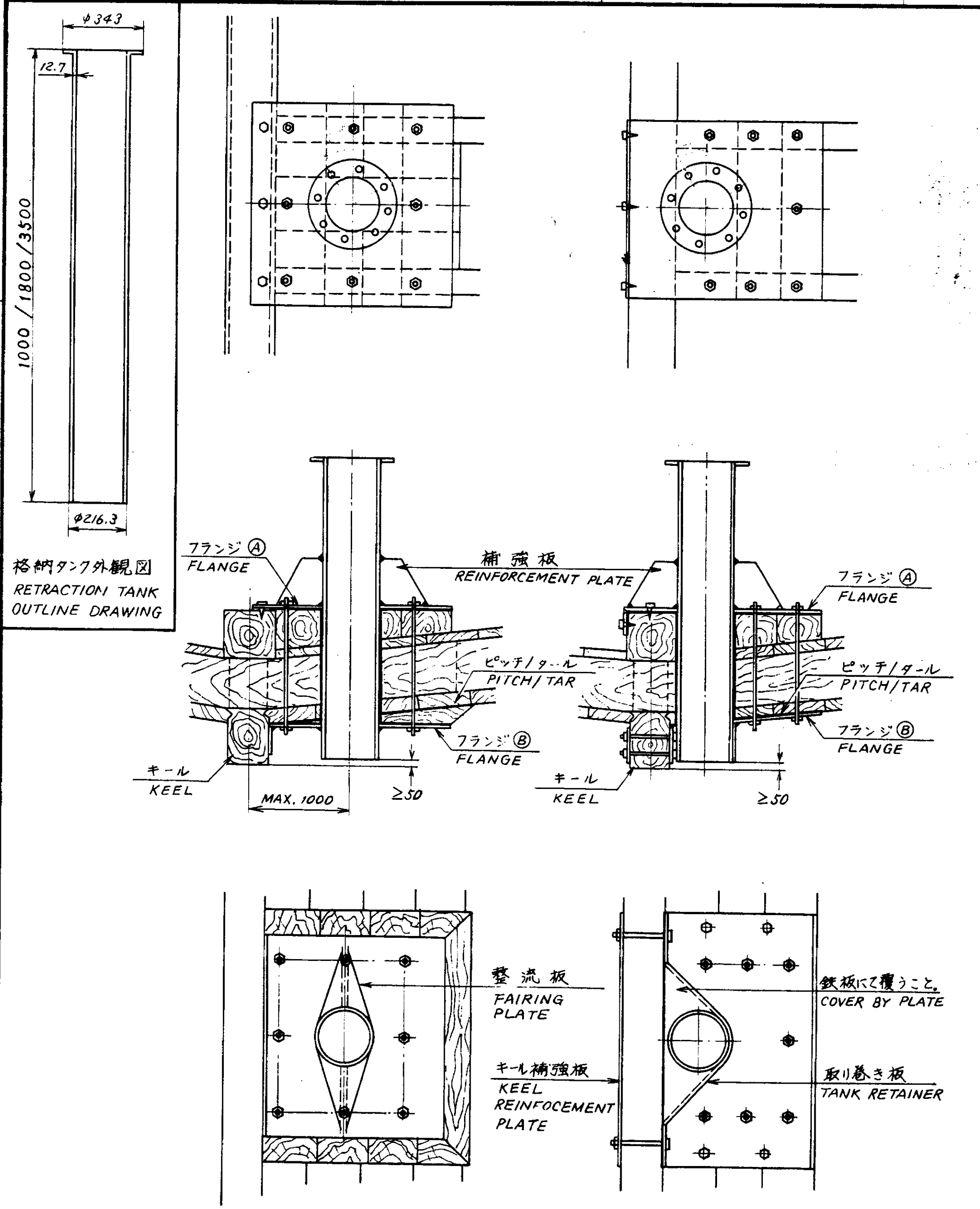
CSH-5
CSH-5 MARK-2
CH-12/14/16/24/26

品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS

承認 APPROVED	NOV. 9 '77	三角法 THIRD ANGLE PROJECTION	名称 TITLE 格納タンク船底装備図（鋼船） RETRACTION TANK INSTALLATION ON STEEL HULL
検図 CHECKED	NOV. 8 '77	尺度 SCALE	
製図 DRAWN	1977.11.7	重量 WEIGHT kg	図番 DWG.NO. C1243-017-F

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FURUNO



キールから離して装備
INSTALLATION OFF KEEL

キール脇に装備
INSTALLATION BESIDE KEEL

単位 UNIT: mm

1. 格納タンクの装備は次の条件を満すこと。
   1) 取付位置は船首から1/3（小型船の場合は1/2）程度。
   2) キールより1m以内。
   3) フランジのボルト締めのため、フランジ下面と障害物（二重船底等）との間に100mm以上のスペースがあること。
   4) タンクの底部はキールの下端より50mm上であること。
   5) タンクのフランジ面は標準走航時に水平であること。

2. 格納タンクの装備は次の要領を参考にして行うこと。
   1) 木のブロック等を使用して助骨間の船底を充分補強する。補強された面は標準走航時水平になる様にする。
   2) タンクが通る穴を開ける。
   3) 必要個所に水密のためのピッチ等を充てん塗布した後、フランジⒶ及びⒷをボルトナットで締めつけて固定する。
   4) タンクを貫通させ、タンクの底部がキール下端より50mm上になる様にフランジⒶ及びⒷに溶接し、固定する。キール脇装備の場合は取り巻き板もタンクに溶接し、キールに固定する。
   5) 格納タンクの突出部分に網除けを兼ねた整流板を設ける。
   6) 必要に応じてタンクの周囲3,4ケ所でフランジⒶに向けて補強板を溶接する。

注: 強度及び水密性について船主、造船所担当者、施工者の間で充分協議し、取付位置、方法、材料等を決定すること。

1. SATISFY THE FOLLOWING CONDITIONS IN DECIDING THE RETRACTION TANK MOUNTING SITE.
   1) ABOUT 1/3 (1/2 IN CASE OF SMALL BOAT) OF SHIP'S LENGTH FROM BOW ON FORE-AFT LINE.
   2) WITHIN 1000 mm FROM KEEL LINE.
   3) ALLOW CLEARANCE OF MORE THAN 100 mm BENEATH TANK FLANGE TO FACILITATE BOLTING.
   4) KEEP LOWEST END OF TANK 50 mm ABOVE BOTTOM OF KEEL.
   5) TANK FLANGE SHOULD BE EXACTLY HORIZONTAL WHEN SHIP IS NORMALLY TRIMMED.

2. INSTALL THE RETRACTION TANK REFERRING TO THE PROCEDURE BELOW.
   1) REINFORCE THE HULL PLATE BETWEEN FRAMES WITH WOODEN BLOCKS OR SO. THE WOODEN BLOCKS SHOULD BE INSTALLED SO THAT THE FLANGE Ⓐ IS LEVELED WHEN THE SHIP IS NORMALLY TRIMMED AS IN THE DRAWING.
   2) CUT OUT A HOLE FOR PASSING THE TANK ON THE HULL BOTTOM, WOODEN BLOCKS AND FLANGES Ⓐ & Ⓑ.
   3) APPLY PITCH, TAR, ETC BETWEEN FLANGES Ⓐ & Ⓑ AND WOODEN BLOCKS OR HULL PALTE FOR SUFFICIENT WATERTIGHTNESS. THEN SETTLE THE FLANGES Ⓐ AND Ⓑ IN POSITION WITH BOLTS AND NUTS.
   4) WELD THE TANK TO THE FLANGES Ⓐ AND Ⓑ. WHEN THE TANK IS INSTALLED BESIDE THE KEEL, WELD THE TANK RETAINER TO THE FLANGE Ⓑ AND THE TANK. THEN FIX THE RETAINER TO THE KEEL WITH BOLTS AND NUTS.
   5) FAIRING PLATE (NET PROTECTOR) SHOULD BE INSTALLED AROUND THE PARTS OF THE TANK PROTRUDING FROM THE BOTTOM BY THE SHIPYARD.
   6) IF REQUIRED, REINFORCEMENT PLATE SHOULD BE INSTALLED BY THE SHIPYARD.

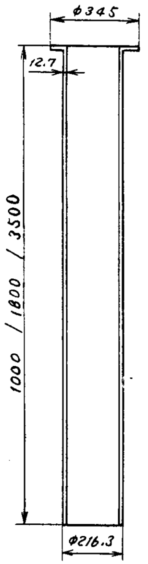
CAUTION: DISCUSSION SHOULD TAKE PLACE AND AGREEMENT BE REACHED WITH THE SHIPYARD FOR SUFFICIENT REINFORCEMENT AND WATERTIGHTNESS OF THE HULL TO COMPLY WITH THE REGULATIONS CONCERNED.

CSH-5
CSH-5 MARK-2
CH-12/14/16/24/26

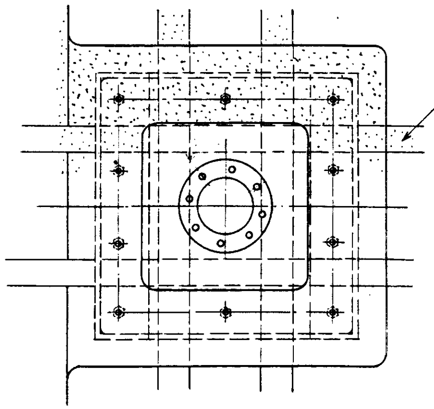
品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS

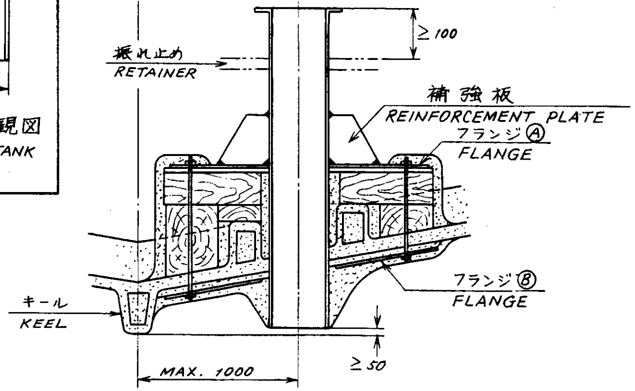
承認 APPROVED	NOV. 9. '77	三角法 THIRD ANGLE PROJECTION	名称 TITLE 格納タンク船底装備図（木船） RETRACTION TANK INSTALLATION ON WOODEN HULL
検図 CHECKED	NOV. 8. '77	尺度 SCALE	
製図 DRAWN	1977. 11. 7	重量 WEIGHT kg	図番 DWG.NO. C1243-018-F

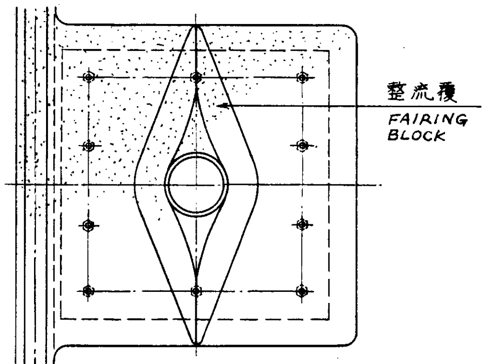
FURUNO ELECTRIC CO., LTD.



鉄製格納タンク外観図
STEEL RETRACTION TANK
OUTLINE DRAWING







単位 UNIT: mm

1. 格納タンクの装備は次の条件を満すこと。
   1) 取付位置は船首から1/3（小型船の場合は1/2）程度。
   2) キールより1m以内。
   3) フランジのボルト締めのため フランジ下面と障害物（二重船底等）との間に100mm以上のスペースがあること。
   4) タンクの先端はキールの先端より50mm上であること。
   5) タンクのフランジ面は標準走航時に水平であること。

2. 格納タンクの装備は、次の要領を参考にして行うこと。
   1) フレーム間の船底にタンクが通る穴をあける。
   2) タンクあるいはタンクと同径の中子を貫通させ、その回りにフランジⒶの乗せられる取付台を作りFRPでフレーム、船底間に固定する。
   3) フランジⒶの取付穴に合わせて取付台にボルトを立てておく。必要があればフランジⒷを作りボルトを船底から貫通させる。
   4) FRP硬化後タンクあるいは中子を抜き取る。
   5) フランジⒶをタンクに溶接する。
   6) フランジⒶ下面及びタンク外周にFRP－鉄接着剤を塗布した後タンクを取りつける。
   7) 浸水を防ぐため充分にFRPで必要個所を塗り固める。特にタンク回りは流線型に成型し水による抵抗及び気泡発生を最少限におさえる様努めること。
   8) 必要に応じてタンクのフランジ面下部100mmの位置より隔壁等に向けて振れ止めを設けること。また フランジⒶ溶接時、タンクの周囲3，4ケ所でフランジⒶに向けて補強板を溶接する。

注： 強度及び水密性について、船主、造船所担当者、施工者の間で充分協議し、取付位置、方法、材料等を決定すること。

1. SATISFY THE FOLLOWING CONDITIONS IN DECIDING THE RETRACTION TANK MOUNTING SITE.
   1) ABOUT 1/3 (1/2 IN CASE OF SMALL BOAT) OF SHIP'S LENGTH FROM BOW.
   2) WITHIN 1000 mm FROM KEEL LINE.
   3) ALLOW CLEARANCE OF MORE THAN 100 mm BENEATH TANK FLANGE TO FACILITATE BOLTING.
   4) KEEP LOWEST END OF TANK 50 mm ABOVE BOTTOM OF KEEL.
   5) TANK FLANGE SHOULD BE EXACTLY HORIZONTAL WHEN SHIP IS NORMALLY TRIMMED.

2. INSTALL THE RETRACTION TANK REFERRING TO THE PROCEDURE BELOW.
   1) CUT OUT A HOLE FOR PASSING THE TANK ON THE HULL PLATE.
   2) PASS THE TANK OR A CORE HAVING THE SAME DIAMETER AS THE TANK THRU THE HULL PLATE. MAKE A MOUNTING BED WITH WOODEN BLOCK AND FRP AROUND THE TANK OR THE CORE. THIS BED IS USED TO MOUNT THE FLANGE Ⓐ.
   3) WHEN FABRICATING THE MOUNTING BED, STAND THE BOLTS ON THE BED FOR FIXING THE FLANGE Ⓐ. IF NECESSARY, MAKE THE FLANGE Ⓑ TO ENSURE FIXING OF THE FLANGE Ⓐ.
   4) AFTER FRP IS STIFFENED, DRAW OUT THE TANK OR THE CORE FROM THE MOUNTING BED.
   5) WELD THE FLANGE Ⓐ TO THE TANK.
   6) APPLY A STEEL-FRP ADHESIVE TO THE TANK AND THE FLANGE Ⓐ, AND INSTALL THE TANK WITH FLANGE Ⓐ IN PLACE. SETTLE THE FLANGE Ⓐ WITH BOLTS AND NUTS.
   7) APPLY FRP AROUND THE PARTS OF THE TANK PROTRUDING FROM THE HULL BOTTOM FOR SUFFICIENT REINFORCEMENT. MAKE A FAIRING BLOCK WITH FRP AROUND THE PROTRUDING PARTS OF THE TANK TO MINIMIZE THE EFFECT OF AERATION
   8) IF REQUIRED, INSTALL A REINFORCEMENT PLATE WHEN THE FLANGE Ⓐ IS WELDED TO THE TANK. IT IS ADVISABLE TO PROVIDE REINFORCEMENT ANGLES BETWEEN THE TANK AND THE ADJACENT BULKHEAD OR CEILING.

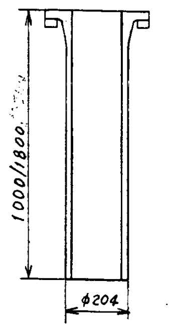
CAUTION: DISCUSSION SHOULD TAKE PLACE AND AGREEMENT BE REACHED WITH THE SHIPYARD FOR SUFFICIENT REINFORCEMENT AND WATERTIGHTNESS OF THE HULL TO COMPLY WITH THE REGULATIONS CONCERNED.

CSH-5
CSH-5 MARK-2
CH-12/14/16/24/26

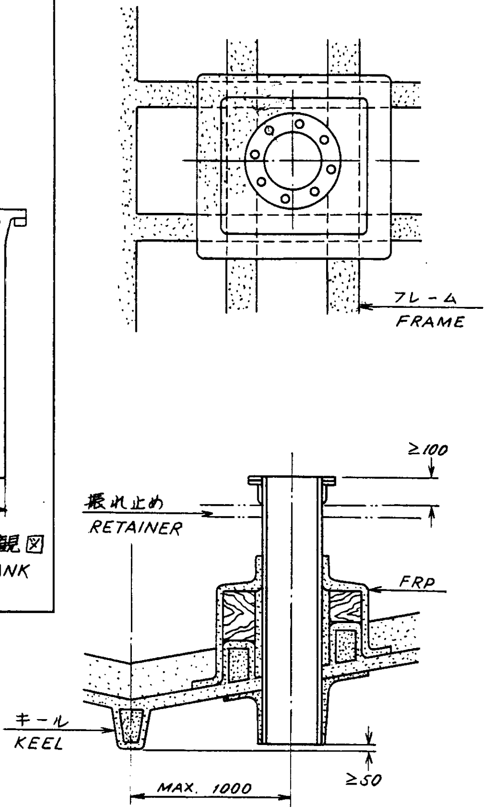
品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG. NO.	摘要 REMARKS

承認 APPROVED	NOV. 9. '77	三角法 THIRD ANGLE PROJECTION		名称 TITLE	鉄製格納タンク船底装備図（FRP船） STEEL RETRACTION TANK INSTALLATION ON FRP HULL
検図 CHECKED	NOV. 8. '77	尺度 SCALE			
製図 DRAWN	1977. 11. 7	重量 WEIGHT	kg	図番 DWG. NO.	C1243-019-F

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FRP製格納タンク外観図
FRP RETRACTION TANK OUTLINE DRAWING



1. 格納タンクの装備は次の条件を満すこと。
   1) 取付位置は船首から1/3（小型船の場合は1/2）程度。
   2) キールより1m以内。
   3) フランジのボルト締めのためフランジ下面と障害物（二重船底等）との間に100mm以上のスペースがあること。
   4) タンクの先端はキールの先端より50mm上であること。
   5) タンクのフランジ面は標準走航時に水平であること。

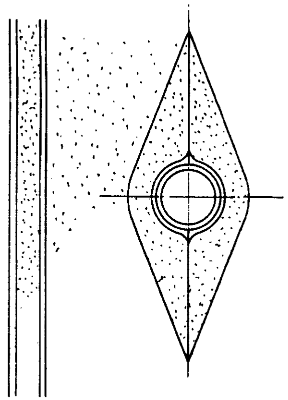
2. 浸水を防ぐため充分にFRPで必要個所を塗り固める。特にタンク回りは流線型に成型し水による抵抗及び気泡発生を最少限におさえる様努めること。
3. 必要に応じてタンクのフランジ面下部 100mmの位置より隔壁等に向けて振れ止めを設けること。

注：強度及び水密性について、船主、造船所担当者、施工者の間で充分協議し、取付位置、方法、材料等を決定すること。

1. SATISFY THE FOLLOWING CONDITIONS IN DECIDING THE RETRACTION TANK MOUNTING SITE.
   1) ABOUT 1/3 (1/2 IN CASE OF SMALL BOAT) OF SHIP'S LENGTH FROM BOW.
   2) WITHIN 1000mm FROM KEEL LINE.
   3) ALLOW CLEARANCE OF MORE THAN 100mm BENEATH TANK FLANGE TO FACILITATE BOLTING.
   4) KEEP LOWEST END OF TANK 50mm ABOVE BOTTOM OF KEEL.
   5) TANK FLANGE SHOULD BE EXACTLY HORIZONTAL WHEN SHIP IS NORMALLY TRIMMED.

2. APPLY FRP AROUND THE PARTS OF THE TANK PROTRUDING FROM THE HULL BOTTOM FOR SUFFICIENT REINFORCEMENT. MAKE A FAIRING BLOCK WITH FRP AROUND THE PROTRUDING PARTS OF THE TANK TO MINIMIZE THE EFFECT OF AERATION.
3. IT IS ADVISABLE TO PROVIDE REINFORCEMENT ANGLES BETWEEN THE TANK AND THE ADJACENT BULKHEAD OR CEILING.

CAUTION: DISCUSSION SHOULD TAKE PLACE AND AGREEMENT BE REACHED WITH THE SHIPYARD FOR SUFFICIENT REINFORCEMENT AND WATERTIGHTNESS OF THE HULL TO COMPLY WITH THE REGULATIONS CONCERNED.



CSH-5
CSH-5 MARK-2
CH-12/14/16/24/26

品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS

承認 APPROVED		三角法 THIRD ANGLE PROJECTION		名称 TITLE	FRP製格納タンク船底装備図(FRP船) FRP RETRACTION TANK INSTALLATION ON FRP HULL
検図 CHECKED	May. 14. 1998	尺度 SCALE			
製図 DRAWN	July. 18. 1998	重量 WEIGHT	kg	図番 DWG.NO.	C1220-038-F

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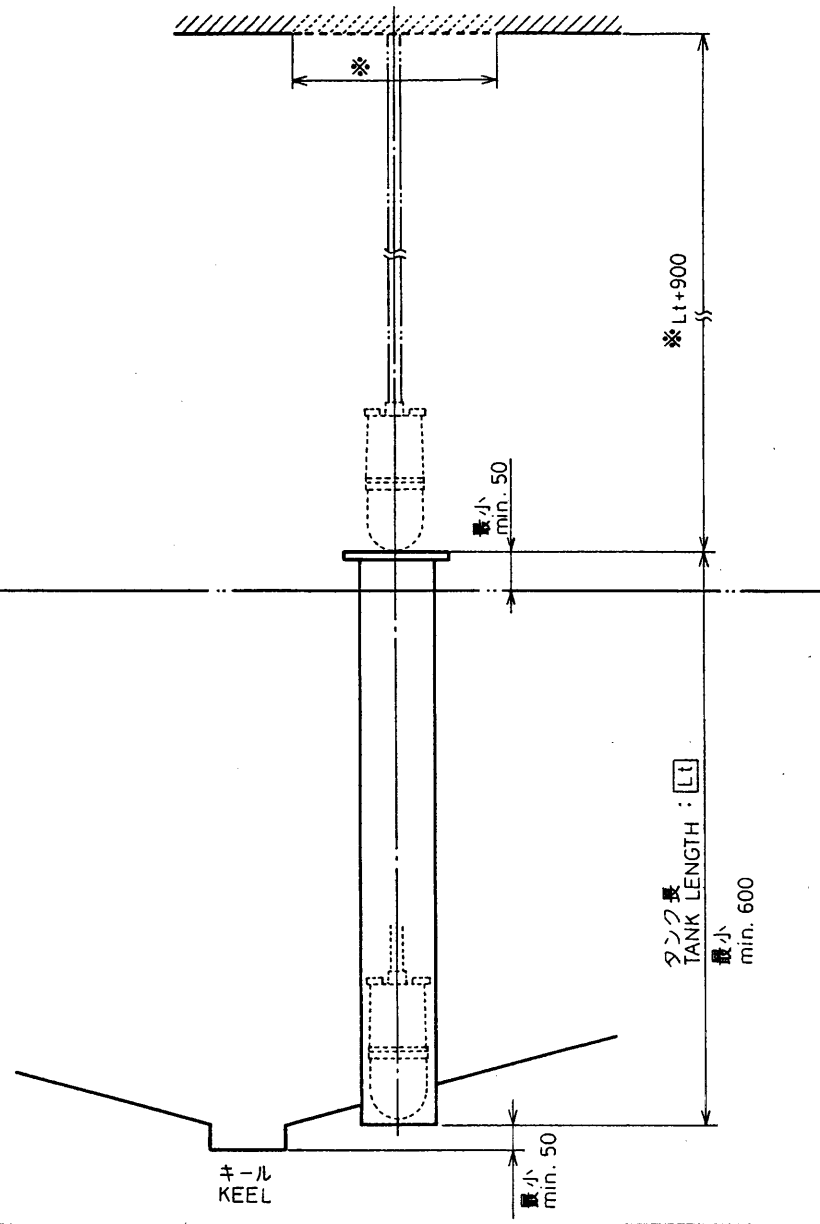
FURUNO

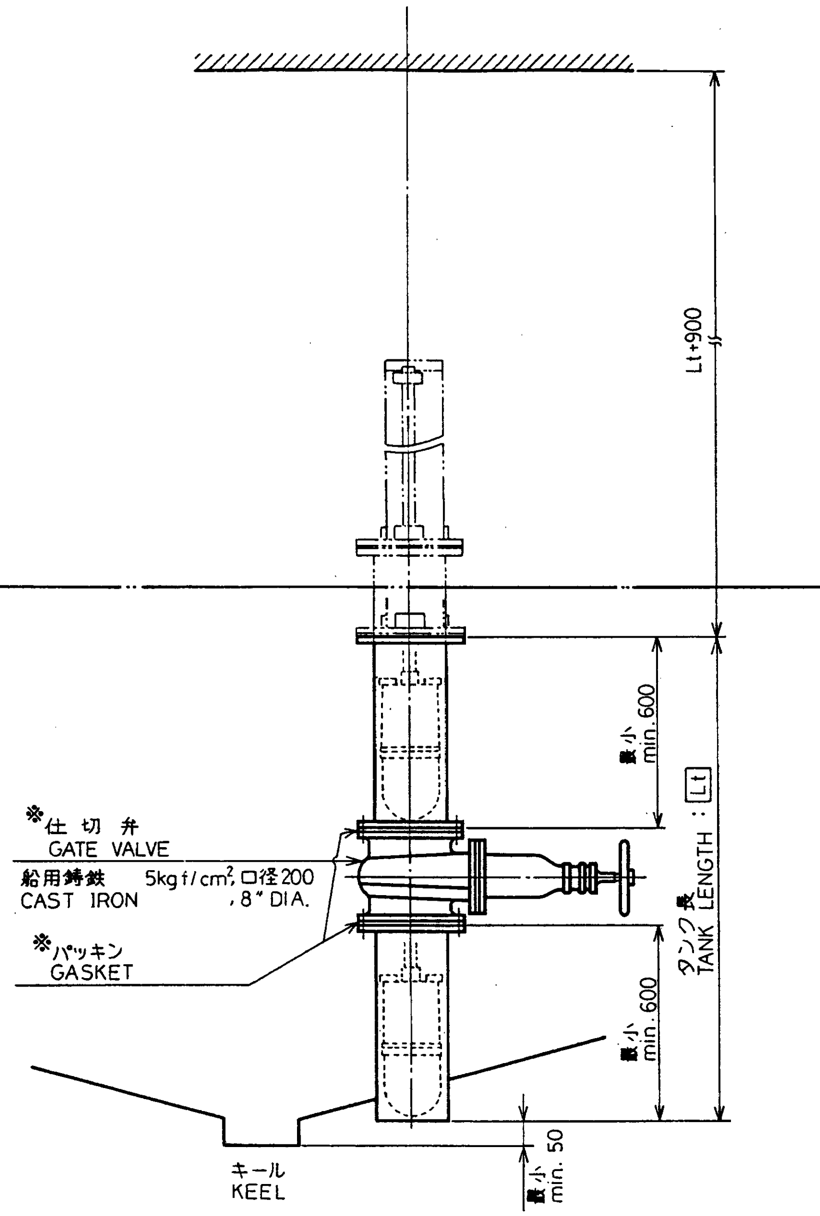
D－11

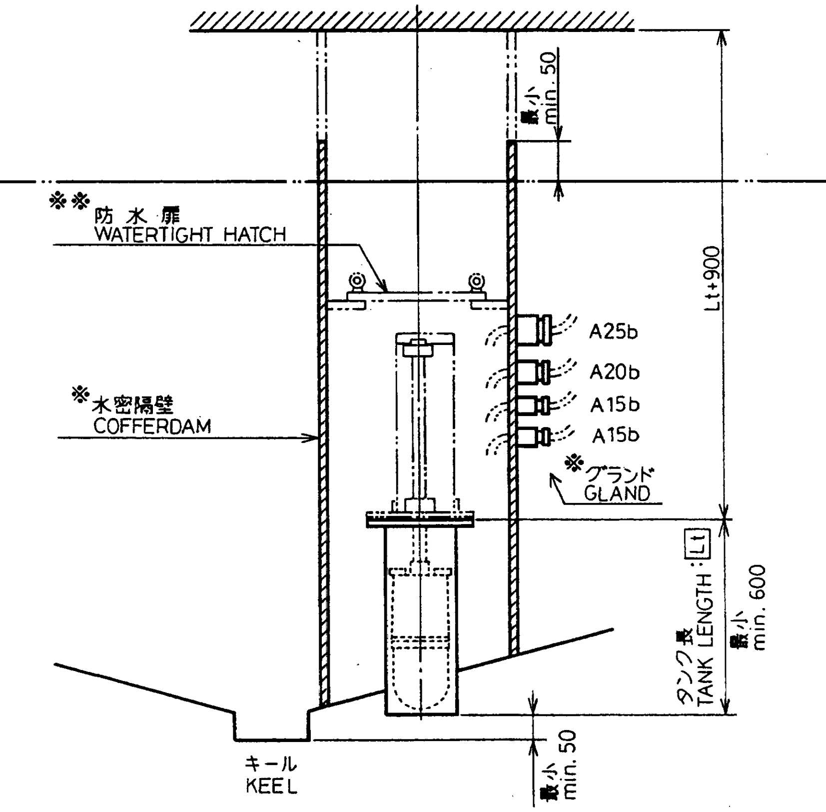
条件 CONDITION		
A	B	C
タンク長を満載時の吃水線の上までとれる場合。 WHEN THE LONGER TANK IS USED SO THAT IT FLANGE POSITIONS ABOVE WATER LINE.	1. オフシーズンに上下装置を取り外しておく場合。 THIS METHOD ALLOWS TO EASILY REMOVE THE SOUNDOME DURING A PERIOD OF NON-OPERATION OR SERVICING. 2. タンク長を吃水線の上までとれない場合。 WHEN THE LONGER TANK IS NOT USED DUE TO LIMITED CLEARANCE.	タンク長を吃水線までとれない場合で、仕切り弁を使用しない時。 WHEN THE LONGER TANK OR A GATE VALVE CAN NOT BE USED.

装備法 METHOD

満載時の吃水線
WATER LINE AT FULL LOAD







注 NOTE

A

1. この装備法を標準として推奨する。
   THIS METHOD IS RECOMMENDED AS STANDARD INSTALLATION.
2. ※：上下装置の上部に"LTt＋930"のサービス空間が取れない場合は、天井に"300×300"の穴を明けておくこと。
   ※：IF OVERHEAD CLEARANCE "Lt＋930" IS NOT ALLOWED, MAKE A HOLE OF 300×300mm ON CEILING FOR FACILITATING INSTALLATION AND FUTURE SOUNDOME SERVICE.

B

1. 条件 (1) の目的でこの装備法を行なう場合には左図 (A) と同様に吃水線の上までタンク長をとる方が望ましい。
   LIKE THE INSTALLATION METHOD [A], THE TANK FLANGE POSITION IS DESIRED TO BE ABOVE WATER LINE.

C

1. 水密隔壁は船級協会規則を参照し造船所で作成下さい。その際サービススペースも考慮して下さい。
   FABRICATE THE COFFERDAM BY SHIPYARD IN ACCORDANCE WITH CONCERNED REGULATIONS. ALSO ALLOW ENOUGH MAINTENANCE SPACE.
2. ※※：水密隔壁の上限を吃水線の上までとれない場合にも、上下装置取り外しのための防水扉を設けること。
   ※※：PROVIDE A WATERTIGHT HATCH FOR FUTURE MAINTENANCE IF A COFFERDAM IS NOT HIGH ABOVE WATER LEVEL.

品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG. NO.	摘要 REMARKS

注 NOTE

1. 装備法の決定に際しては安全性（強度, 水密性）を重視し、それに併せて保守・点検の容易さも考慮のこと。
   DECIDE AN INSTALLATION METHOD CONSIDERING SUFFICIENT REINFORCEMET AND WATERTIGHTNESS OF THE SHIP'S HULL. ALSO PROVIDE ENOUGH MAINTENANCE SPACE.
2. ※, ※※, ；造船所手配
   SHIPYARD SUPPLY.
3. 単位 UNIT : mm

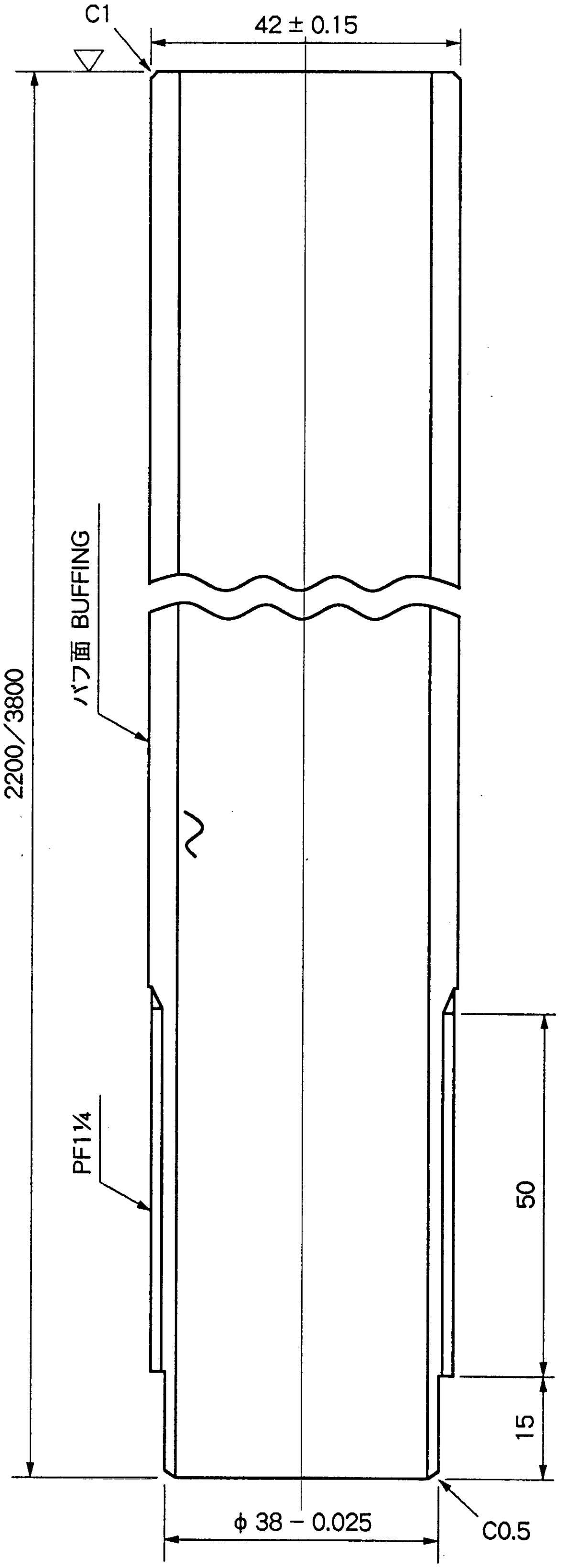
CH－34／36

承認 APPROVED	・ ・	三角法 THIRD ANGLE		名称 TITLE	格納タンクの装備例 RETRACTION TANK INSTALLATION METHOD
検図 CHECKED	・ ・	尺度 SCALE	／		
製図 DRAWN	・ ・	重量 WEIGHT	kg	図番 DWG.NO	C1282-Y01-A

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D-12



注. 1) 外径42±0.15肉厚3.5の冷間仕上げ継目無ステンレス鋼管に、光輝焼鈍処理及びバフ研磨（＃300）後の材料を使用のこと。

2) 真直度は1／1000以内のこと。

NOTE 1) USE COLD FINISHING SEAMLESS STAINLESS STEEL TUBE, AFTER BRIGHT ANNEALING AND BUFFING, WITH OUTER DIAMETER 42 ± 0.15 AND THICKNESS 3.5.

2) TUBE SHOULD BE STRAIGHT TO WITHIN 1/1000.

CH-24/26/34/36

品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG. NO.	摘要 REMARKS

承認 APPROVED	APR・28・'92 T. WAKANO	三角法 THIRD ANGLE	名称 TITLE 上下シャフト MAIN SHAFT
検図 CHECKED	APR・28・'92 M. USUDA	尺度 SCALE /	
製図 DRAWN	Apr・28・'92 T. MIYOSHI	重量 WEIGHT kg	図番 DWG.NO C1269 − G01 − A

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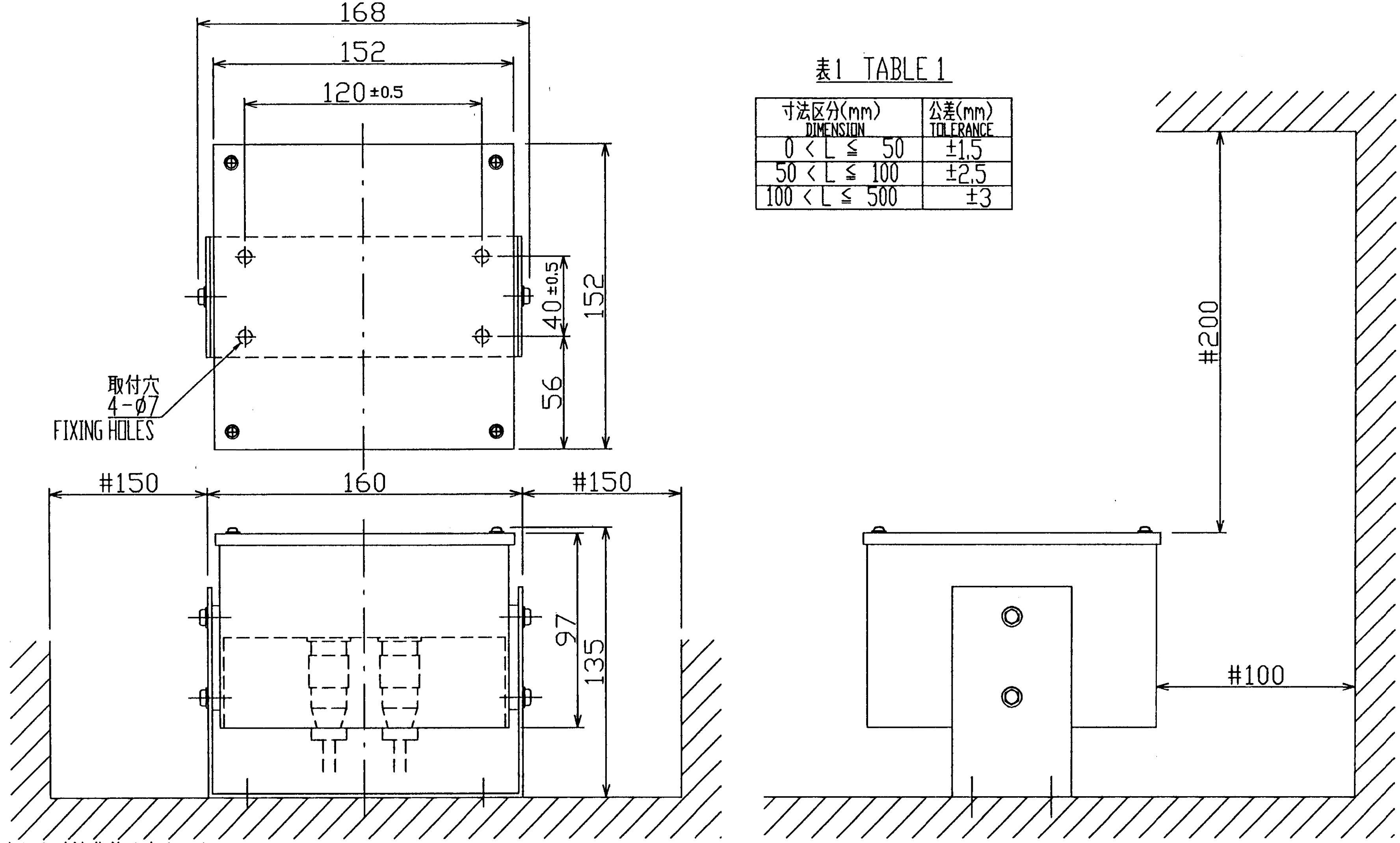


表1 TABLE 1

寸法区分(mm) DIMENSION	公差(mm) TOLERANCE
0 < L ≦ 50	±1.5
50 < L ≦ 100	±2.5
100 < L ≦ 500	±3

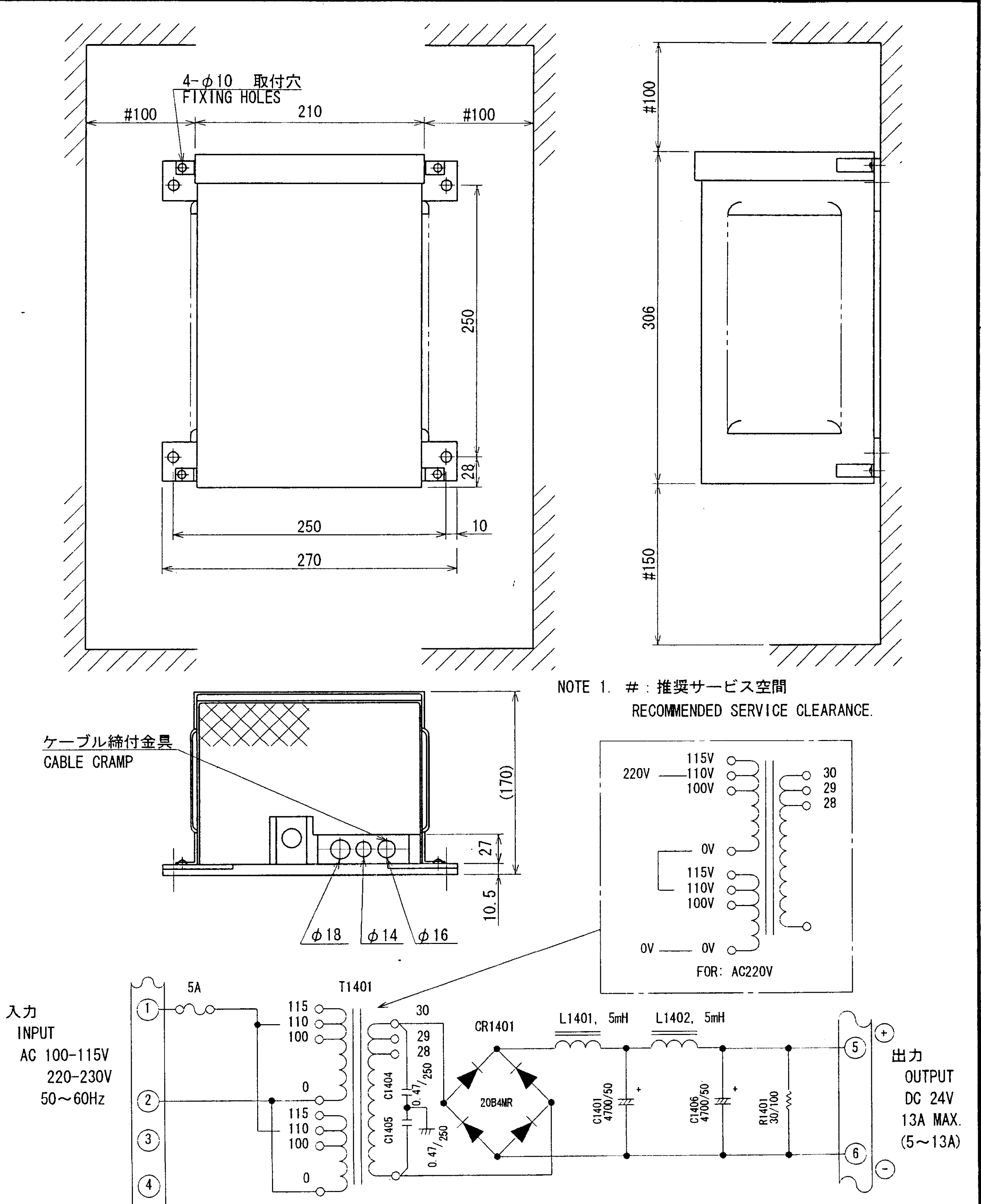
注記
1）指定なき寸法公差は表1による。
2）#：推奨する最小サービス空間寸法。
3）船首マーク(FORE)を船首方向に向けて、
きょう体を水平に取り付けること。

NOTE
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
2. #: RECOMMENDED SERVICE CLEARANCE.
3. ORIENT THE 'FORE' MARK ON THE UNIT TOWORD SHIP'S BOW AND MOUNT THE UNIT LEVEL IN PARALLEL WITH SURFACE.

DRAWN Nov. 6 '01 T.YAMASAKI		TITLE	MS-100
CHECKED Nov.6 '01 Y.Kim		名称	動揺検出器
APPROVED Nov.6 '01 Y.Kim			外寸図
SCALE 1/3	MASS 1.1 kg ±10%	NAME	MOTION SENSOR
DWG.No. C1278-G01- B			OUTLINE DRAWING

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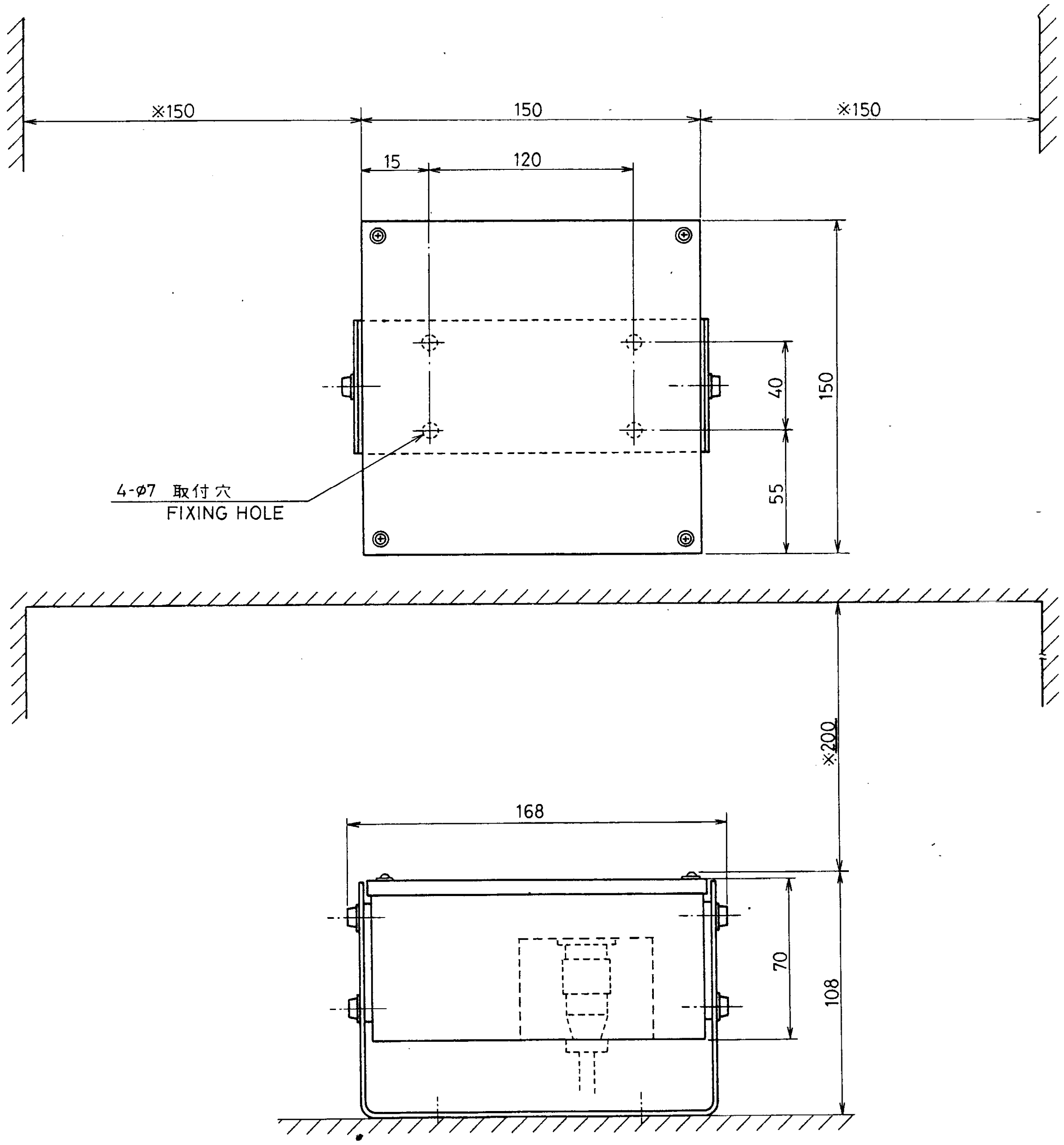


NOTE 1. #：推奨サービス空間
RECOMMENDED SERVICE CLEARANCE.

注記 AC220V入力に対しては T1401の一次巻線を直列に接続する。
NOTE FOR 220V AC INPUT, CONNECT T1401 PRIMARY WINDINGS IN SERIES.

DRAWN Aug 16 '00 T.YAMASAKI		TITLE	RU-1746B-2
CHECKED Aug 17 '00 Y.Kim		名称	整流器
APPROVED Aug 17 '00 Y.Kim			外寸図
SCALE 1/5	MASS 17 kg ±10%	NAME	RECTIFIER UNIT
DWG. No. C3002-002- N			OUTLINE DRAWING

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NOTE 1. 保守点検及び放熱用として ※印のスペースをとる事。
DIMENSIONS MARKED "※" SHOW RECOMMENDED MAINTENANCE AND VENTILATION SPACE.
2. 船体の回転の中心に水平に取り付ける事。
INSTALL THE UNIT HORIZONTALLY ON THE ROTATION AXES OF SHIP'S ROLLING AND PITCHING.

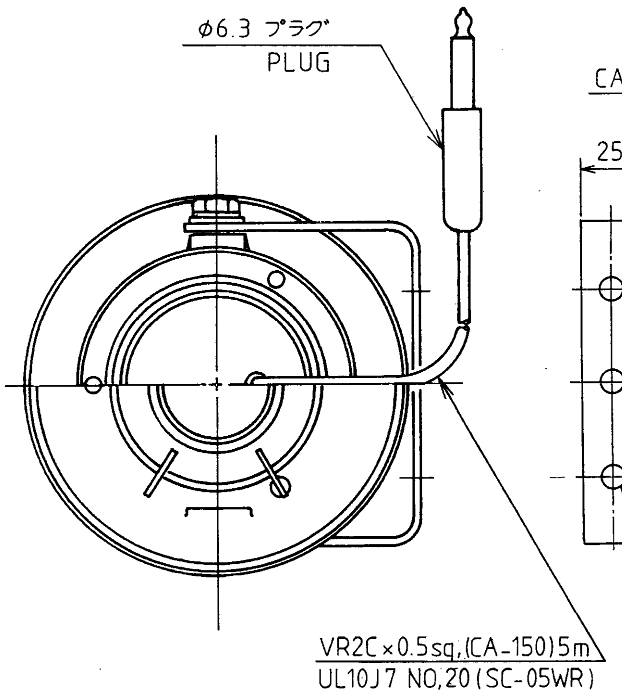
品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG. NO.	摘要 REMARKS

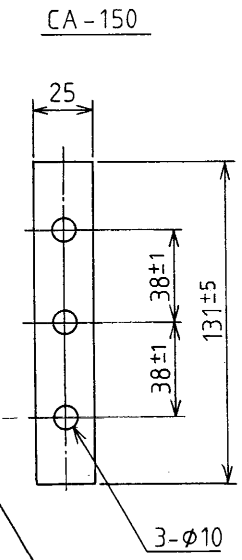
承認 APPROVED	JAN. 8 '86.	三角法 THIRD ANGLE PROJECTION		名称 TITLE BS-704	傾斜角検出器 CLINOMETER
検図 CHECKED	Jan. 8. '86	尺度 SCALE	1/3		
製図 DRAWN	Oct. 29. '85	重量 WEIGHT	2 kg	図番 DWG. NO.	C1259-009-C

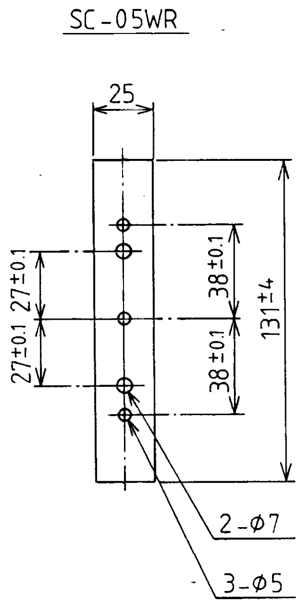
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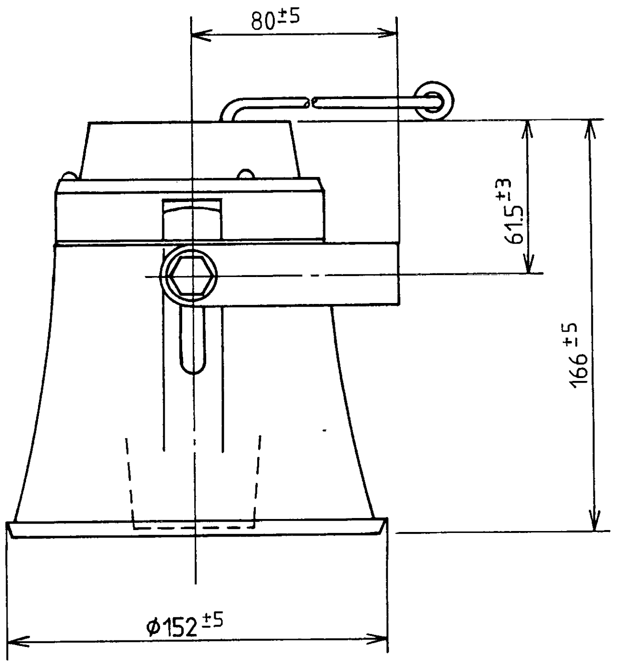
FURUNO

D-16









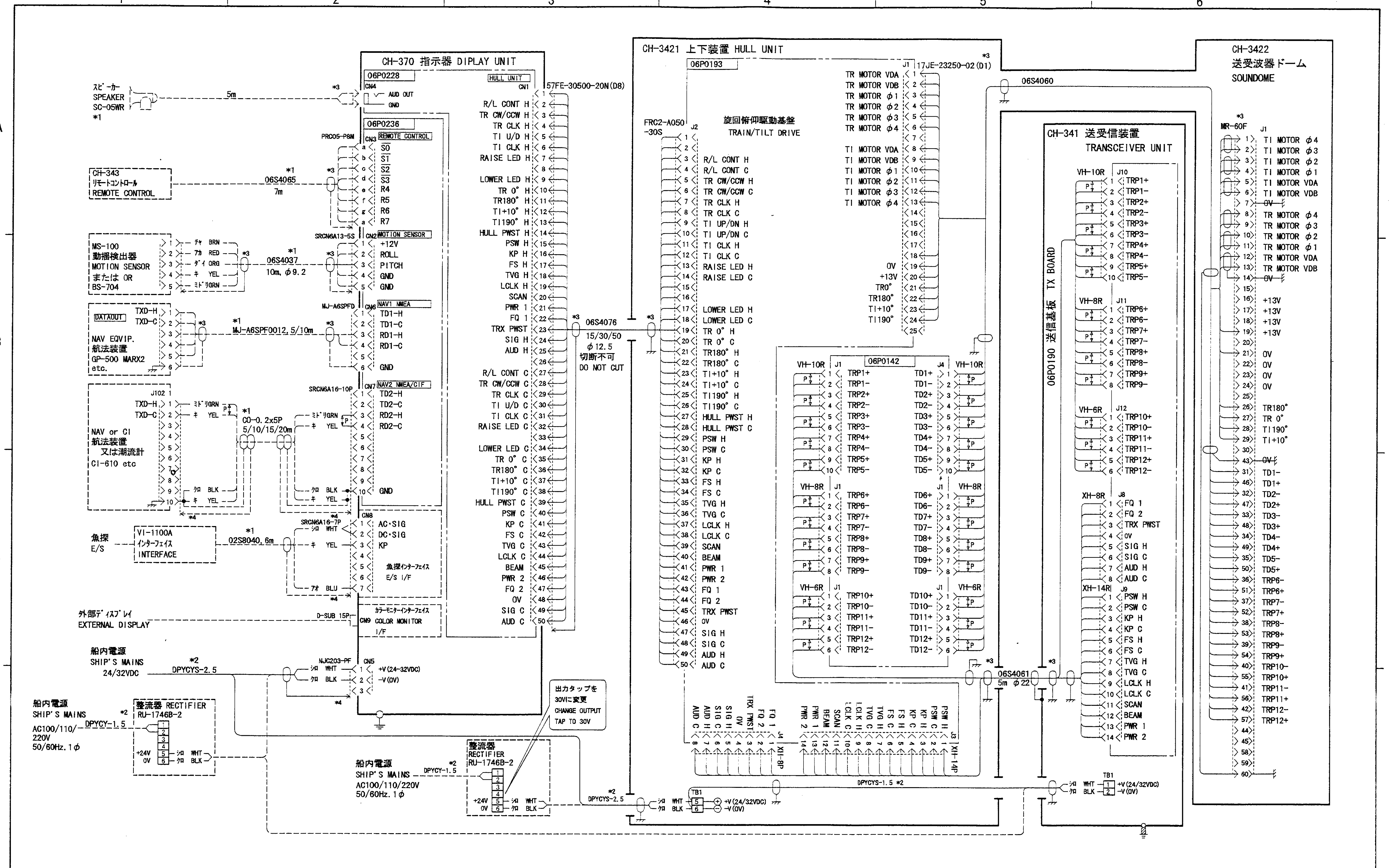
RATING

MAX. INPUT 5W
IMPEDANCE 4Ω
SOUND PRESSURE 104dB
FREQ. RESPONSE 400Hz~5kHz

品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS

承認 APPROVED	SEP. 20. '88 T. NAKANO	三角法 THIRD ANGLE PROJECTION	名称 TITLE 5W トランペット スピーカ
検図 CHECKED	Sept. 20. 88 M. IKEDA	尺度 SCALE 1/3	CA-150 SC-05WR TRUMPET SPEAKER
製図 DRAWN	Aug. 30. '88 K. Kusunoki	質量 MASS 1.2 kg	図番 DWG.NO. C5016-101-D

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注 記
＊1）オプション
＊2）造船所手配
＊3）工場にて取付済み。
＊4）コネクタのクランプを通し接地する。

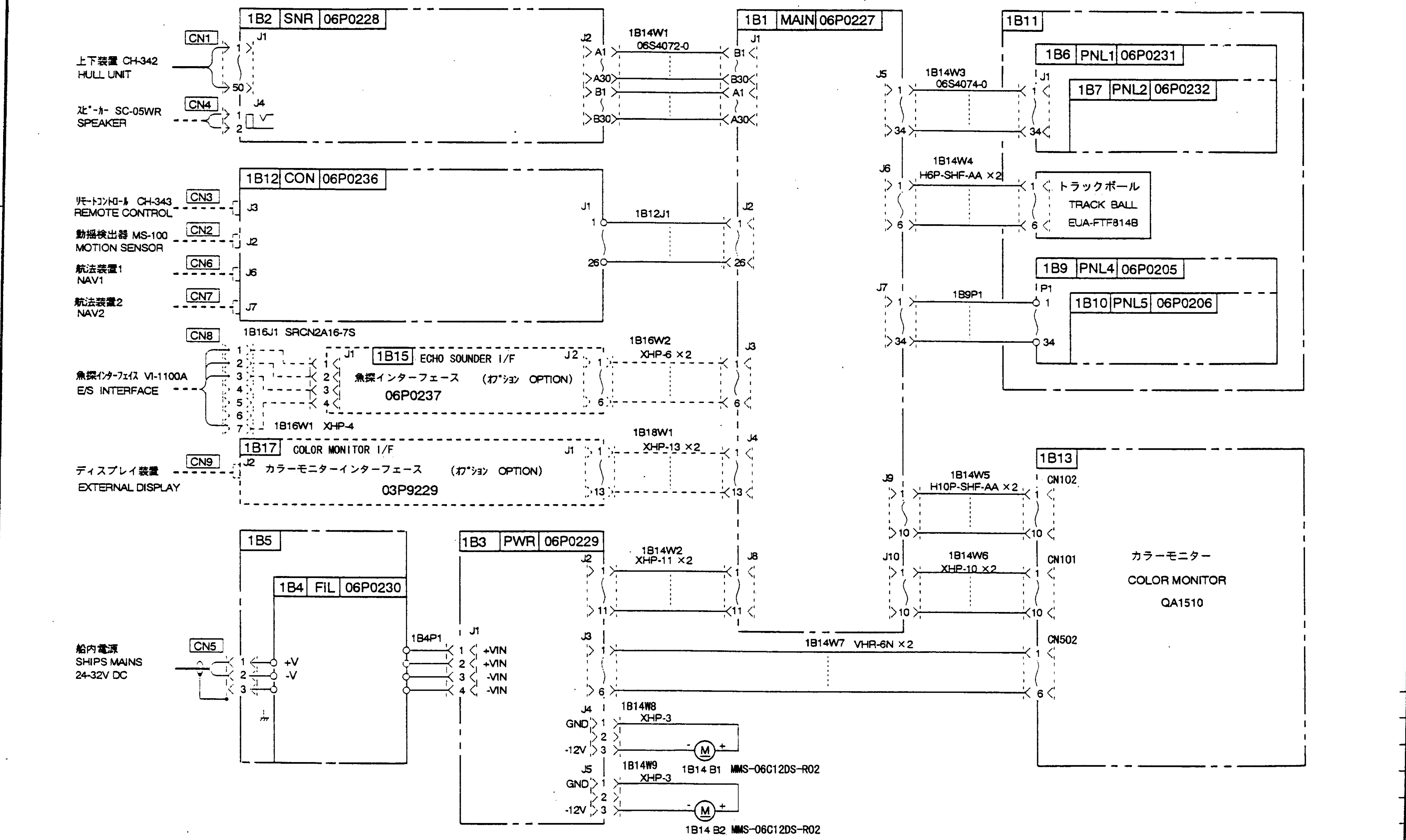
NOTE
*1. OPTIONAL SUPPLY.
*2. SHIPYARD SUPPLY.
*3. FITTED AT FACTORY.
*4. GROUNDING THRU CONNECTOR CLAMP.

CO-0.2x5P: CO-SPEVV-SB-C 0.2x5P, φ13.5

DRAWN Mar. 30 '01 T. YAMASAKI	TYPE	CH-37	
CHECKED Mar. 30 '01 Y. Kimura	名称	カラーセクタースキャニングソナー	
APPROVED Apr. 5 '01 S. Yoshimura		相互結線図	
	NAME	COLOR SECTOR SCANNING SONAR	
DWG. No. C1303-C01- C	06-020-0001-0	INTERCONNECTION DIAGRAM	

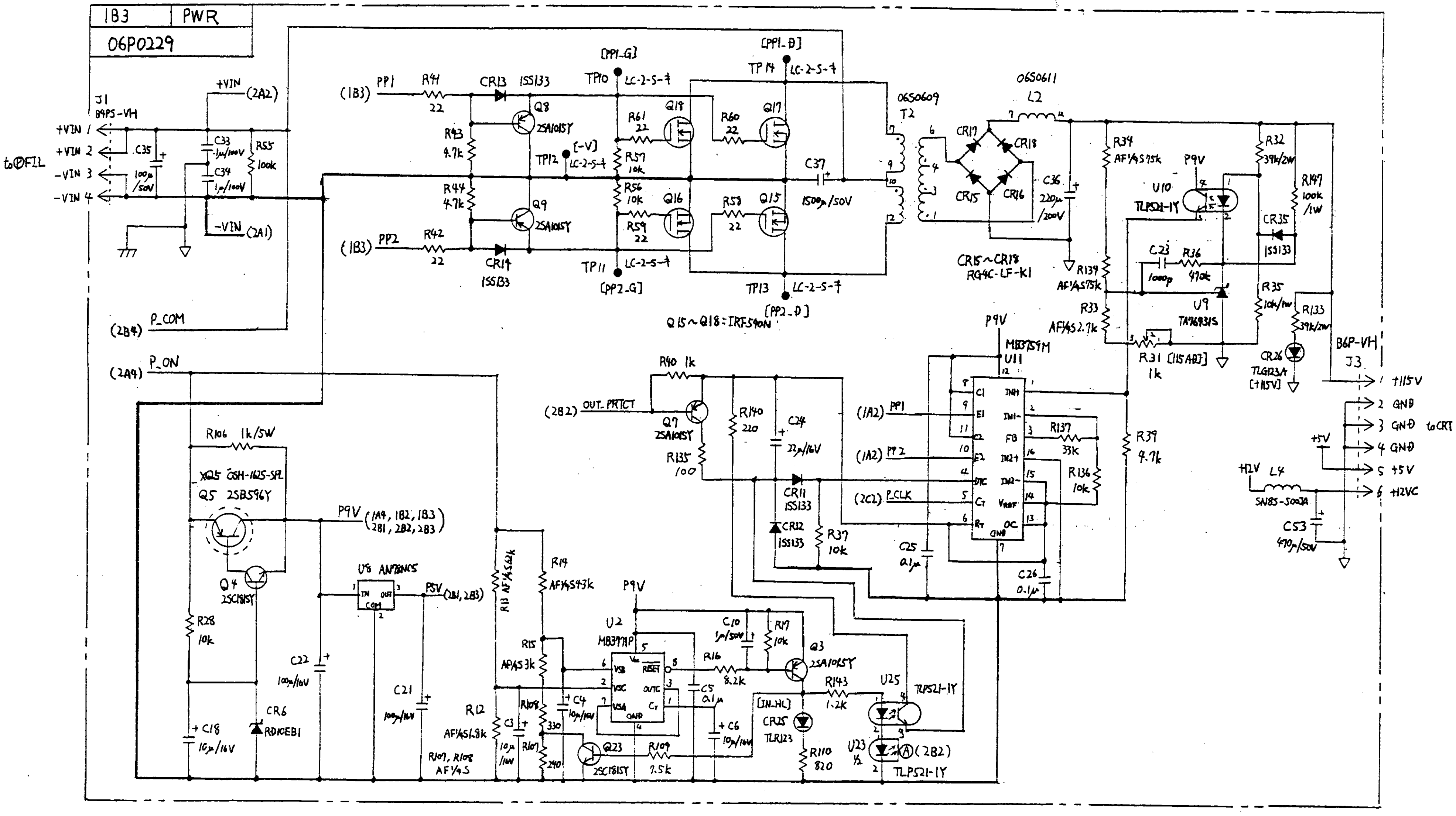
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DRAWN July. 15 '98 T.YAMASAKI		TYPE	CH-370
CHECKED July 16 '98 K.Kusunoki		名称	指示器 (総合)
APPROVED July 16 '98 K.Kusunoki	CH-37		回路図
SCALE / MASS kg	APPLICABLE TO: (MODEL) BLOCK NO.	NAME	DISPLAY UNIT (GENERAL)
DWG NO. C1303-K01- C	06-020-1001- 3		SCHEMATIC DIAGRAM

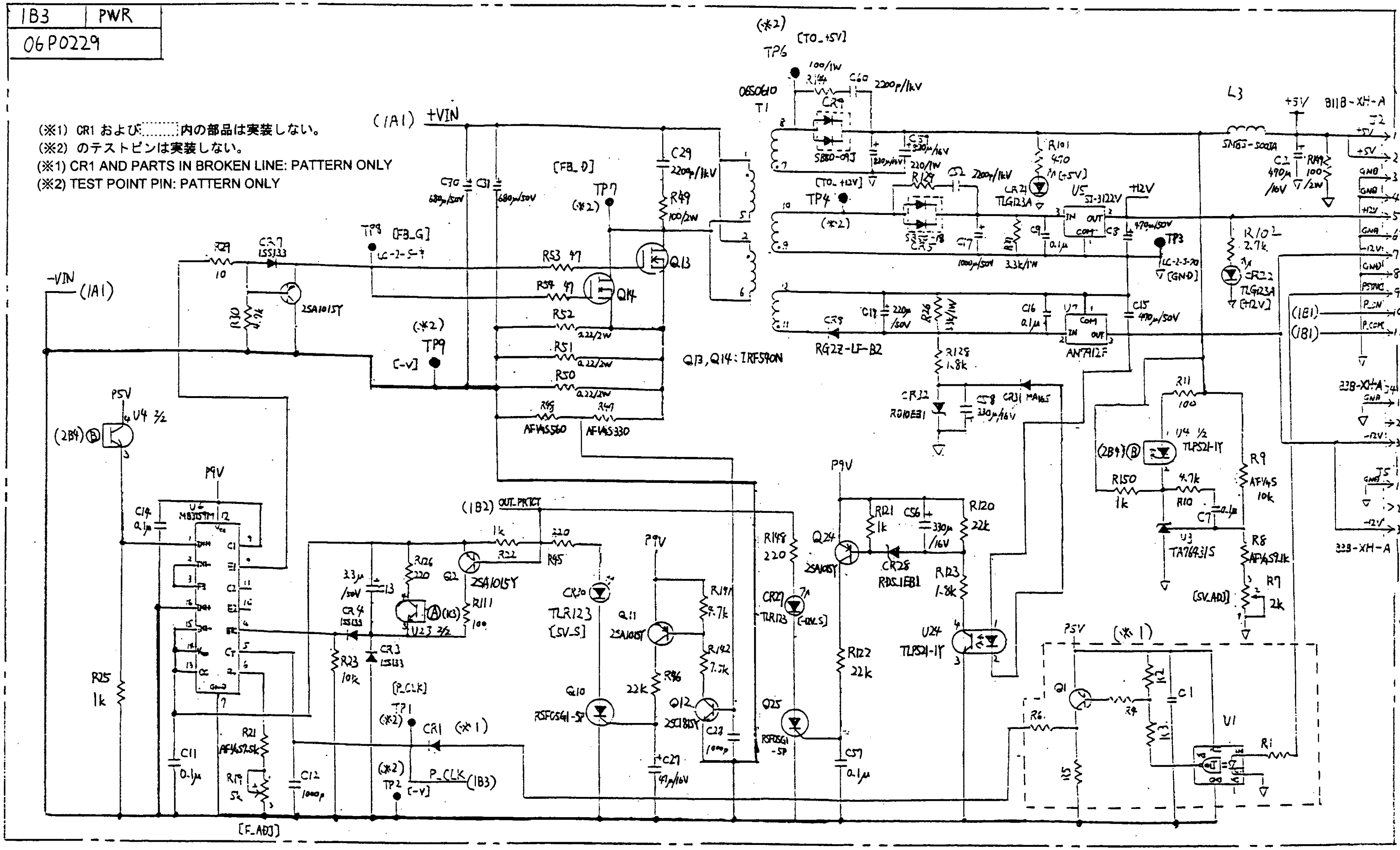
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DRAWN Apr. 8 '98 T. Yamasaki		TYPE 06P0229
CHECKED Apr. 9 '98 K. Kusunoki		名称 電源基板 (1/2)
APPROVED Apr. 9 '98 K. Kusunoki	CH-370 / 1B 3	回路図
SCALE / MASS kg	APPLICABLE TO: (MODEL) / BLOCK NO.	NAME PWR PCB (1/2)
DWG NO. C1303-K02- B	06-020-1301- 1	SCHEMATIC DIAGRAM

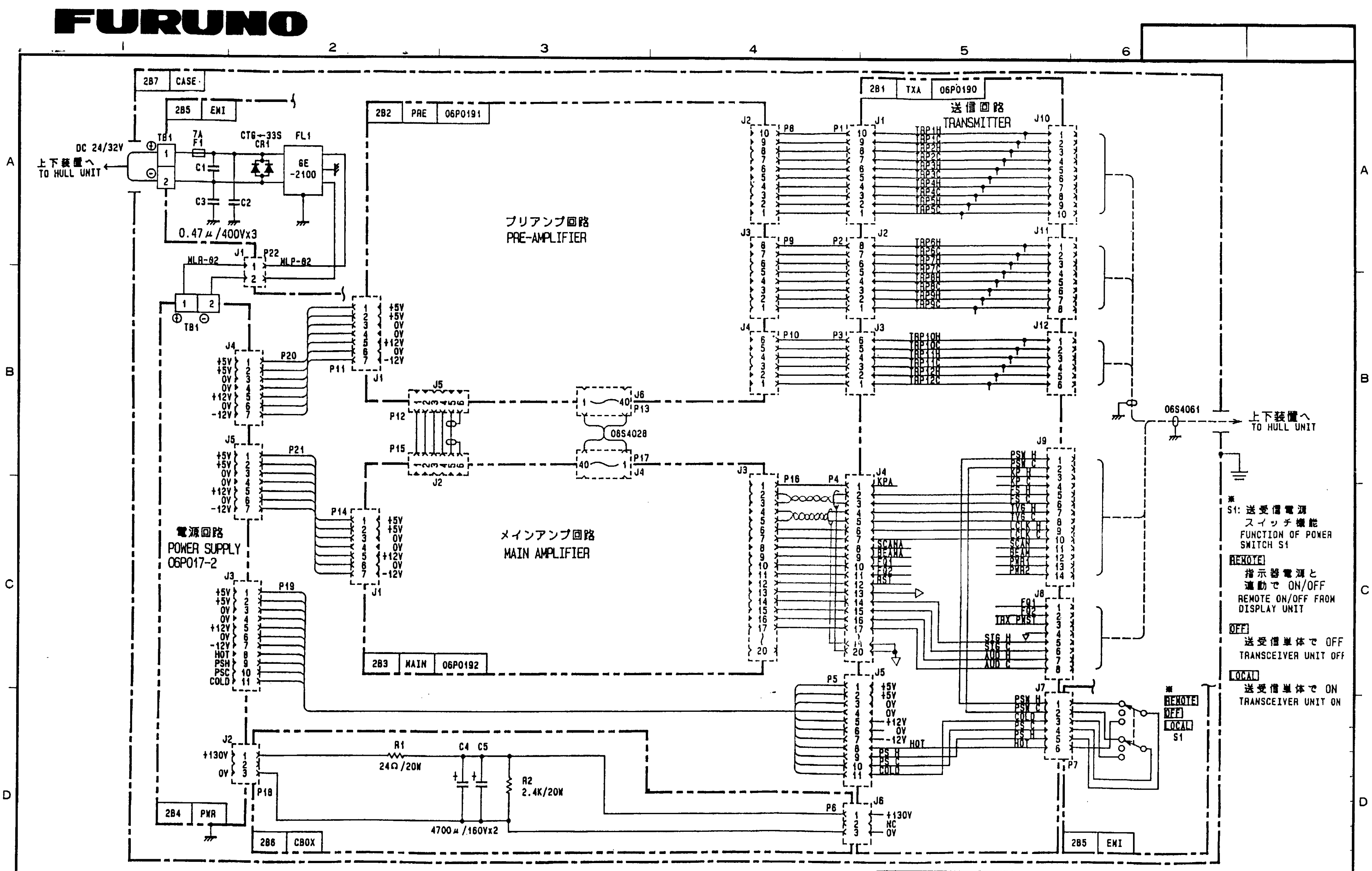
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DRAWN Apr. 8 '98 T.YAMASAKI		TYPE	06P0229
CHECKED Apr. 9 '98 K.Kawasaki		名称	電源基板（2／2）
APPROVED Apr. 9 '98 K.Kawasaki	CH-370 / 1B 3		回路図
SCALE / MASS kg	APPLICABLE TO: (MODEL) / BLOCK NO.	NAME	PWR PCB (2/2)
DWG NO. C1303-K03- B	06-020-1302- 1		SCHEMATIC DIAGRAM

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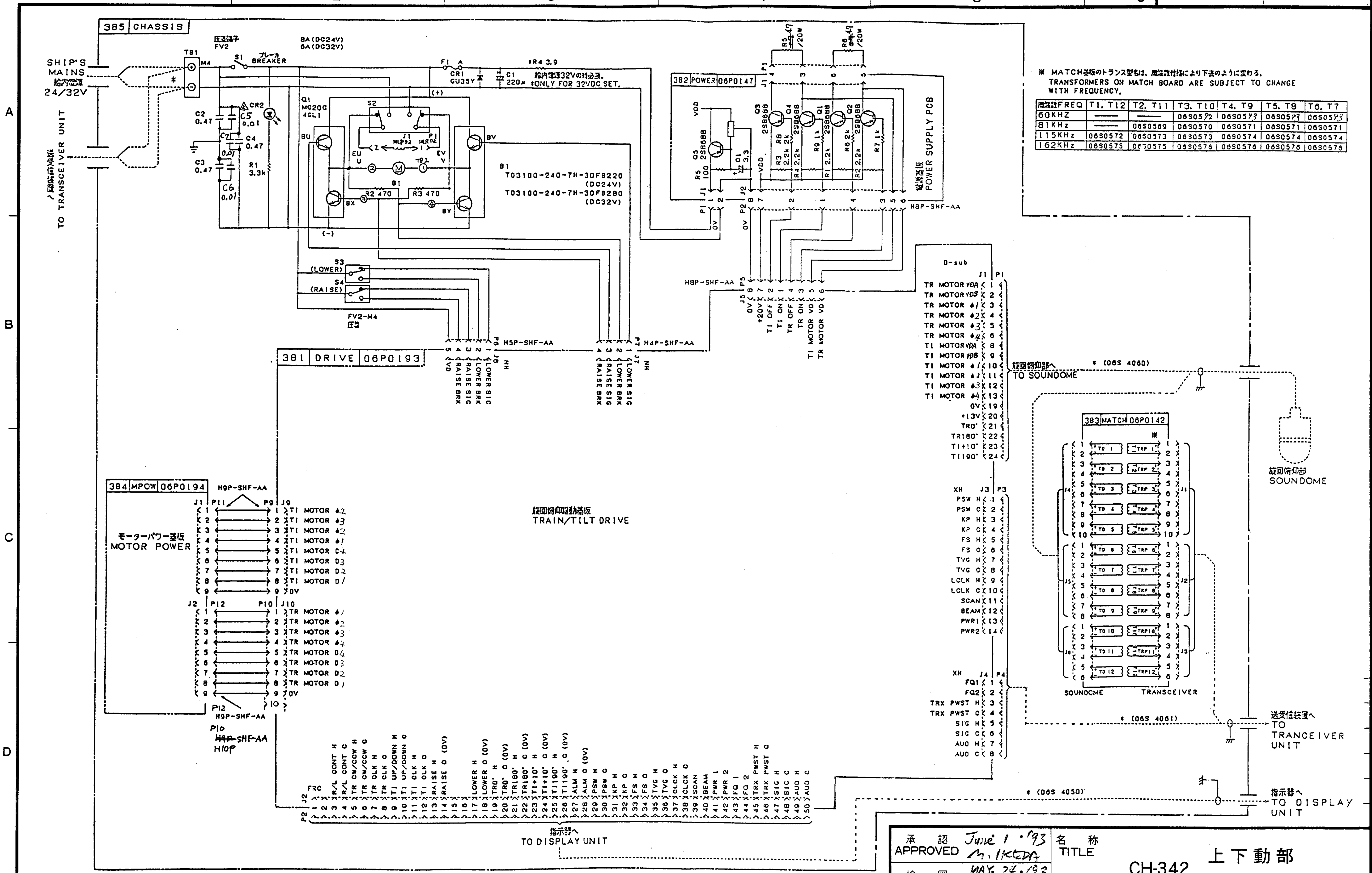


承認 APPROVED	June 1 '93 M. IKEDA	名称 TITLE	CH-341 送受信装置 TRANSCEIVER UNIT
検図 CHECKED	MAY 24 '93 M. USUDA		
製図 DRAWN	Mar. 15 '93 K. OKAMOTO	図番 DWG. NO.	C1282-K16-A

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S-6



※ MATCH基板のトランス型名は、周波数仕様により下表のように変わる。
TRANSFORMERS ON MATCH BOARD ARE SUBJECT TO CHANGE WITH FREQUENCY.

周波数FREQ	T1, T12	T2, T11	T3, T10	T4, T9	T5, T8	T6, T7
60KHZ	——	——	06S0592	06S0573	06S0593	06S0573
81KHz	——	06S0569	06S0570	06S0571	06S0571	06S0571
115KHz	06S0572	06S0573	06S0573	06S0574	06S0574	06S0574
162KHz	06S0575	06S0575	06S0576	06S0576	06S0576	06S0576

承認 APPROVED	June 1 '93 M. IKEDA	名称 TITLE	CH-342 上下動部 HULL UNIT
検図 CHECKED	MAY. 24. '93 M. USUDA		
製図 DRAWN	Mar. 15 '93 K. OKAMOTO	図番 DWG. NO.	C1282-K21-A

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